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ABSTRACT

This evaluation report consists of a description and longitudinal analysis of the long term educational impact of the Learning to Learn Program on children from poverty backgrounds. The program is based on the principle that children's development follows an orderly sequence of growth from motor to perceptual to symbolic stages. The results of this study indicate that Learning to Learn Program graduates, at the end of second grade, are experiencing impressive educational and developmental success in public school. Data tables, graphs, and photographs are included. (SET)

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A SEQUENTIAL APPROACH TO EARLY CHILDHOOD AND ELEMENTARY EDUCATION

PS 006995

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ED 085101

A SEQUENTIAL APPROACH TO EARLY CHILDHOOD AND ELEMENTARY EDUCATION

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List of Abbreviations for Tables and Text

1. AVA - Auditory Vocal Association Subtest of ITPA
2. bet. - between
3. BGES - Bender Gestalt Error Score
4. CA - Chronological Age
5. C - Control group composed of all children in groups $C4P_3$ and C_5P_2
6. C_4P_3 - Control group who participated in traditional daycare nursery school; Title I kindergarten, public school first and second grade
7. C_5P_2 - Control group who participated in Title I kindergarten, public school first, second and third grade
8. C (90 or >) - Control group composed of children in groups C_4P_3 and C_5P_2 whose pre-project Stanford Binet IQ scores were within or above the average range of intelligence
9. C (89 or <) - Control group composed of children in groups C_4P_3 and C_5P_2 whose pre-project Stanford Binet IQ scores were below the average range of intelligence
10. Diff. - Difference
11. DIQ - Deviation Intelligence Quotient of the PMA
12. E - Experimental group composed of all children in groups E_4P_3 and C_5P_2
13. E_4P_3 - Experimental group who participated in LTLP during nursery, kindergarten and first grade; attended public school in second grade
14. E_5P_2 - Experimental group who participated in LTLP during kindergarten and first grade; attended public school in second and third grade
15. E (90 or >) - Experimental group composed of children in E_4P_3 and E_5P_2 groups whose pre-project Stanford Binet IQ scores were within or above the average range of itelligence
16. E (89 or <) - Experimental group composed of children in E_4P_3 and E_5P_2 groups whose pre-project Stanford Binet IQ scores were below the average range of intelligence
17. GPA - Grade Point Average
18. Grp. - Group
19. ITPA - The Illinois Test of Psycholinguistic Abilities
20. LA - Language Age
21. LTLP - The Learning to Learn Program
22. MA - Mental Age
23. mths. - Months
24. N - Number of participants in study
25. PMA - The Primary Mental Abilities Test
26. Post 2nd - Post second grade
27. Pre-LTLP - Pre-Learning to Learn Program
28. SAT - Stanford Achievement Test
29. SBIQ - Stanford Binet Intelligence Quotient
30. SD - Standard deviation from the mean
31. Sent. - Sentence
32. SRST - The School Readiness Screening Test
33. SS - Scaled Score of WISC subtest
34. t - t statistical test
35. VD - Visual Decoding subtest of ITPA
36. VE - Vocal Encoding subtest of ITPA
37. VIQ - Verbal Intelligence Quotient of the WISC
38. VMA - Visual Motor Association subtest of ITPA
39. WISC - Wechsler Intelligence Scale for Children

List of Abbreviations for Tables and Text con't

40. YATLTLP - Years after termination of the Learning to Learn Program
41. YLTLP - Years in the Learning to Learn Program
42. $>$ - greater than
43. $<$ - less than
44. $\overline{X}$ - Mean
45. $\overline{X}$ Age - Mean Age
46. % - Percent
47. # - Number

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January 2, 1973
Vernon Van De Riet
Michael B. Resnick

PREFACE

This report is designed to describe and evaluate the Learning to Learn Program, a comprehensive, sequential, early childhood educational program developed and demonstrated by Dr. Herbert Sprigle, Ph.D., Clinical Child Psychologist.

The Learning to Learn Program is based on the current evidence in cognitive development that early childhood is the most important period in the development of the child's ability to think, reason, and learn, with major guiding principle that children's development follows an orderly sequence of growth which proceeds from motor to perceptual to symbolic stages.

The Learning to Learn approach to early childhood education is now in its eighth year. Its development was preceded by years of intensive effort in the development of training curriculum and curricular materials for preschool education. The eight years of operation has seen the rapid growth and expansion of the Learning to Learn Program due to its success in educating preschool children.

This evaluation report consists of a description and longitudinal analysis of the long term educational impact of the Learning to Learn Program on children from poverty backgrounds.

ABSTRACT

The purpose of the Learning to Learn Project was to ascertain whether a comprehensive early childhood intervention program for educationally high-risk children could be effective in breaking the educational disabilities of these children in public schools, and insure their long term educational success. A major goal of the project was to attempt to raise the abilities of young children to reach higher levels of intellectual, linguistic, educational, and personal development which would enable them to achieve educationally in later formal education.

The major findings of the project reveal large increases in the intellectual ability as well as average or better academic performance in regular school classrooms one year after termination of the Learning to Learn Program.

The Learning to Learn Program produced major changes or maintained high levels of intellectual functioning in 85 percent of its participants; and, more importantly, developed their academic processes; reading, arithmetic, and communication skills; and personal-social factors to a level commensurate with educational success in public schools. The data concerning social behavior, school conduct, emotional adjustment, and academic motivation consistently reveal the Learning to Learn children show positive attitudes toward themselves, educational school situations, and the way they deal with their day-to-day interpersonal interactions.

The results of this study indicate that the graduates of the Learning to Learn Program at the end of second grade are experiencing impressive educational and developmental success in public school. The magnitude and consistency of these results are not found in the literature pertaining to other preschool or experimental early childhood learning programs.

A SEQUENTIAL APPROACH TO EARLY CHILDHOOD AND ELEMENTARY EDUCATION

CHAPTER I

Introduction

Early childhood education in America is now in a period of rapid transition due to the changing patterns, directions, and goals of life in America. Working mothers now make up a substantial percentage of our labor force, and the percentage will almost certainly increase as we approach the 80's. Economic necessity, need for self-fulfillment, and the increasingly popular option of the single-parent family have made increased demands on the public educational system to provide supplementary and sometimes basic child care. An excellent program of early childhood education available to every child who opts for it seems essential if America's new economic and social patterns are to prosper.

Currently there is an impetus to determine efficient and effective ways to provide quality early childhood educational programs that meet these educational needs and the caretaking responsibilities of their parents. According to Stevenson (1972). "There is a great need for the development of coordinated programs in early childhood education at all levels of training and for varying lengths of time." The Learning to Learn Program and this evaluation of its effectiveness were developed with these objectives in mind. Furthermore, the Project is founded on a wealth of educational and psychological research which indicates that a child's experience in his early years has a large influence on his later social, personal, educational, and cognitive development.

The Learning to Learn Program set out to identify, design, and implement the kinds of experiences which foster early personal-social, intellectual, cognitive, and motivational development. At the same time our objective was to do this in such a way that comprehensive research data could be collected to evaluate the program as it progressed. We believed an evaluation that could stand up to scientific, educational, and practical criticism must be comprehensive, in-depth, and of a longitudinal nature. This report gives an overall view of the program and an in-depth analysis of our evaluation and research findings. It is organized in a fashion that encompasses the total perspective of the Learning to Learn Program. Chapters I and II present the theoretical development of the Learning to Learn Program, its major components, and especially its seven competency areas. Chapter III presents basic elements and applications of the sequential three-year curriculum patterned after Piaget's developmental theories. Chapter IV represents the methodology for the developmental and educational longitudinal evaluation of the children who attended the experimental Learning to Learn Program and the control groups of children who attended traditional educational programs. Chapter V consists of the research findings in terms of the longitudinal data. Chapter VI presents the longitudinal research findings of the effects of the Learning to Learn Program and traditional approaches on children of different initial abilities (pre-project IQ levels either in the average and above average range, or in the below average range).

The results pertaining to the specific hypothesis of the evaluation proposal are presented in Chapter VII. The final chapter, Chapter VIII, is a general review discussing the implications, conclusions, and recommendations based on the wealth of data we have secured from this project.

Background

Currently there is considerable attention focused on the development of new curricula and materials for early childhood education. The impetus for this interest has come from different sources. The first of these is recent research evidence from the field of developmental psychology, where some previously accepted assumptions concerning the optimal developmental environment of young children are being challenged.

One assumption being questioned is that the child is not ready to think, reason, or deal with organized learning material prior to the primary grades. This assumption has been vividly expressed by Rudolph and Cohen (1964) who state "... children of kindergarten age are not quite ready for organized, sequential, academic instruction in reading, writing, and arithmetic, largely as a matter of their overall development at age five. . . . teachers of young children are morally bound to protect the rights of every generation to normal maturing (p. 380)." Research evidence (Bruner, 1960, 1966; Caldwell, 1968; Denenberg, 1970; Hess and Bear, 1968; Ojemann, 1963; and Wann, 1962), however, indicates that the young child's ability, potential, and desire to learn have been underestimated.

A second such assumption is that the major function of early education is to facilitate the social and emotional development of the child, with comparatively little emphasis on cognitive development. This leads to school programs that focus on socialization, school readiness skills, and an abundance of unsequenced play experiences. A corollary to this approach is that an early childhood program focusing on intellectual development can be implemented only at the expense of the child's social and emotional development. This criticism has been answered by Robinson (1968) who states "it is difficult to see how pleasant experiences, stimulating within reasonable limits, can be harmful either to mental health or to cognitive development. One need not deny that sound emotional development is important to contend that optimum intellectual growth is also important. The two are apparently intertwined, with development in the emotional sphere, in part a function of development in the intellectual realm, and vice versa (pp. 44-45)."

A third assumption that we question is that the young child must initially acquire factual knowledge or content in order to develop adequate learning skills for later school success (Bereiter and Engelmann, 1966). In our increasingly complex world it may well be, however, that the abilities to solve problems and to creatively explore the universe are more fundamental than the ability to accumulate present knowledge. Therefore, the crucial test is whether the child has learned to learn, rather than whether any specific content has been mastered.

Developmental psychologists maintain that intellectual, psychological, and social development proceed along an orderly sequence of motor-perceptual-symbolic phases with transitional periods in the developmental pattern. Gesell, 1948; Hurlock, 1959; Havighurst, 1953; Piaget, 1962, 1963, 1965; Prescott, 1957; Breckenridge and Vincent, 1955; and others have written about this sequential development. In order that the child may successfully deal with each of these phases the proper tools and stimulation must be available to him in his environment. Concomitantly, the absence of the necessary tools and stimulation will bring about the incomplete mastery of these phases. This aspect of developmental psychology has had a profound affect upon the implementation of the supplementary educational programs for poverty children which have occupied so much of our attention in recent years.

A second source of the attention focused on the development of new curricula and materials for early childhood education is the commitment of the federal government to the education of the poverty child. This represents a major undertaking for our educational systems and has commanded the time, energy and talent of a distinguished group of men and women.

On the basis of our most promising theories, preschool intervention programs would seem to be our most effective means of providing for adequate academic achievement and social adjustment for the poverty child. Yet, despite a multitude of such programs within the last five years the results have been discouraging. According to the Westinghouse Report, Jensen Report, and DiLorenzo (1969), with a few exceptions, the impressive gains registered by poverty children in compensatory programs designed especially for their benefit are no longer evident after one year in public school. Test results also reveal that a substantial gap still exists between the achievement levels of poverty and middle class children.

School systems, especially those with large numbers of educationally high-risk poverty children, continue to operate in crisis. "Despite considerable professional and lay concern and the infusion of funds, educational attainments of the disadvantaged seemed not to have improved substantially.......Certainly, evaluations of the various ESEA Title I and Office of Economic Opportunity programs indicate only spotty and limited success. Some educators have come to believe that compensatory programs are futile." (Passow, 1970). Jensen (1969) states "compensatory education has been tried and it apparently has failed."

There is, however, an educational preschool program which has demonstrated a significant measure of success with poverty children. The Learning to Learn Program is a unique preschool program consisting of a planned sequential set of learning experiences which were developed by Dr. Herbert A. Sprigle, Director of the Learning to Learn School in Jacksonville, Florida. The program emphasizes teaching children how to learn by means of a curriculum based on Piaget's developmental theory and current research studies in early childhood education.

What this implies is that the Learning to Learn early childhood education program is, (1) appropriate to the child's stage of cognitive development; (2) makes maximal use of the child's abilities; (3) makes use of a planned sequence of environmental stimulation which is based on a knowledge of the stages of cognitive development, (4) develops the child's awareness of the process of learning; and (5) guides and structures specific learning experiences rather than confronting the child with random, accidental stimulation. Chapter II offers a more detailed explanation of the rationale underlying the program.

CHAPTER II

The Learning to Learn Program

Educational Rationale for the Development of the Learning to Learn Program

Dr. Sprigle's extensive work with young children and his study of current research literature led him to conclude that the previously accepted narrow definition of the whole child had grossly underestimated the child's psychological strength and potential for learning, and also, that most "traditional" preschool programs were neither relevant nor appropriate to what the children would later encounter, especially poverty children. He, therefore, undertook to design and operate an early childhood education program, based on the following three premises:

1. Every child has an inner drive toward maturity, increased competence, and mastery over his environment; he looks to adults for behavior and attitudes which are appropriate to this growth.

2. The first few years of school should provide the child with opportunities to learn to learn, through school experiences of an emotional-social-cognitive nature.

3. The formal educational process optimally begins in early childhood, with an organized, systematic, sequential curriculum and curricular materials introduced at this point.

Thus the Learning to Learn Program is a comprehensive developmental approach to the education of young children seeking to effectively integrate a number of variables that bear directly on education: the child, the teacher, the curricular materials, and the parent.

Goals which characterize the Learning to Learn Program are:

1. Giving the teacher and child a sense of purpose and direction.
2. Making the teacher responsible for the emotional-social-cognitive development of every child.
3. Recognizing individual differences and adjusting teaching strategies to each child's rate and level of learning.
4. Providing a continuum of learning experiences appropriate to each child's rate and level of learning.

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5. Making the child aware of the learning process and of how to utilize his potential to learn.

6. Providing continuity with first grade.

In order to attain the goals listed above specific objectives evolved as necessary components of the program. They are:

1. To introduce a continuous sequential curriculum founded upon concepts and structures seen as basic to the overall development of young children.

2. To change the traditional role and function of the teacher by emphasizing:

   a. responsibility for seeing that every child, every day, is exposed to planned learning experiences and materials.

   b. guidance and stimulation which will diminish teacher dominance of the school situation and encourage conversation and social interaction.

   c. active participation, inquiry, and exploration by the child.

3. To change the traditional role and function of the child by emphasizing:

   a. development of those inner attributes which enhance learning: attention, concentration, delay before responding, reflection, persistence, effort, etc.

   b. joy in participation over concern for achievement with the focus on the process of learning rather than the content being learned.

   c. application of knowledge acquired in order to make a contribution to himself and to someone else.

   d. awareness of how he is learning and can utilize himself in learning.

   e. independence through freedom with responsibility.

   f. skill in developing strategies for problem-solving and decision-making.

   g. balanced social, emotional, and intellectual development.

4. To accommodate individual differences in the rate and level of learning by a carefully sequenced curriculum, a variety of curricular materials, and the use of small groups monitored by a teacher who adjusts her teaching methods to these differences.

5. To give the teacher an opportunity to work with small groups and individual children by utilizing teacher assistants.

6. To involve parents and encourage their commitment to the objectives of the program by an active parent education program and by the provision of "homework"-type activities which reinforce the activities and values of the school.

Dr. Sprigle's daily observations of the behavior and interactions of teachers and children during the experimental use of the Learning to Learn Program, combined with his knowledge and experience in the fields of child development, education, and learning, confirmed the importance of the following statements about the methods and curriculum utilized in the Learning to Learn Program.

1. The likelihood for meaningful and permanent learning is greater if the child is given the opportunity to be an active learner and from the onset is given a major share of work and responsibility. This lively participation can be achieved through an open discussion and exchange of ideas between teacher and children; also through involving the child in decision making and problem-solving activities. The teacher must allow the child to be more active than she.

2. A child's awareness that the application of his knowledge has made a contribution to himself and to someone else builds up a sense of self-worth.

3. Inner satisfaction and feelings of adequacy develop when the curriculum is structured so that the child can cope with and master each new learning experience. The confidence gained from each success improves his performance and stimulates his growth toward independence and responsibility.

4. Learning appears to be more meaningful to the child when it comes in the form of a problem or game which challenges him and sparks his curiosity. The challenge occurs when he meets a situation that is familiar yet includes an element of the unknown or calls for a level of functioning one step higher than what he is used to.

5. Knowledge, language, concepts, and attitudes acquired in school will more likely become a part of the child's permanent repertoire of behavior if they are immediately useful to him in the making of decisions and the solving of problems in his daily life.

6. The child is given opportunities for the interaction of multiple sensory and motor activities, and is encouraged to develop language to talk about these activities.

7. Exposing the child to learning experiences will have lasting good effects if these experiences are properly timed and structured and offered to the child on a continuing basis.

8. The child learns to communicate effectively from interaction with a teacher who stimulates and sensitively guides his reasoning. She provides a friendly social setting for an exchange of views and a sharing of information.

9. For lasting effects the school should provide for the active involvement of parents and encourage their commitment to the objectives of the program.

Theoretical Basis of the Learning to Learn Program

The Learning to Learn curriculum is based on the assumption that cognitive growth and development proceed in an orderly sequence with periods of transition. It was assumed, on the basis of past research that the sequence proceeds from motor to perceptual to symbolic aspects of cognitive functioning. In the motor stage the child's first cognitive working concern is in manipulating the world through actions. By establishing a relationship between experience and action, the child becomes aware of certain surface features by which he can identify the objects with which he works and objects in the world around him. Through the perception of the world around him he learns the relationships between the various things he observes. He must be given the opportunity to perceive, recognize, categorize, and discover relationships. This leads to the stage of symbolic formation which enables the child to talk about and deal with things and ideas in the abstract, or in the absence of any tangible objects or relationships. With the acquisition of the ability to communicate verbally comes the capacity to recall the past, represent the present, and to think about the future and the "possible." Language becomes a vitally important tool for thinking, reasoning, and communicating things that the child has not said or heard before.

The curriculum is designed to progress from low to high in motor-perceptual-symbolic skills and also to move across these dimensions in a sequential fashion. Each activity builds upon the vocabulary and experience of the previous activities. The curriculum progresses through a planned sequence of tasks designed to move the child from a stage of dependency on actual manipulation of concrete objects to the point where he can internalize and manipulate without the presence of concrete materials. It has been organized and sequenced to serve three important functions:

1. To help the child develop and organize knowledge;
2. To help the child develop learning strategies; and
3. To help the child develop an awareness of a learning hierarchy.

With the establishment of the Learning to Learn Program within a theoretical framework, the next essential step toward putting the theory to work was the necessity for translating theory and research into a curriculum with practical content which would facilitate a child's progress through this developmental sequence.

Teaching Methods of the Learning to Learn Program

In this approach to learning, the teachers are child oriented rather than subject matter oriented. They spend less time talking and more time making keen and sensitive observations about the child's rate and level of learning. Their major purpose is to pose problems for the children, ask questions, and stimulate interest and curiosity. The role of the teacher is to get the children to become active in the learning process and to make their own discoveries, formulate their own questions, and learn from their own activities, observations,and formulations. The teacher, therefore, must be perceptive and sensitive to the way in which each particular child works with and uses the materials.

The children are given the opportunity to develop strategies for gathering information, problem solving, and decision making. The acquisition of these skills provides them with a basis for confident, independent learning. The teacher creates an atmosphere where she is a source of stimulation, but where the children are given the major share of the work in the learning process. With such an approach each child gets continuous feedback that he can trust himself and his abilities. At the same time he becomes aware of his limitations in a non-threatening atmosphere.

Since children of the same chronological age reveal different levels of development as well as different rates of learning, it was decided to implement the sequential curriculum with small groups of three or four children selected for homogeneity on these variables. The careful use of groups is in accord with Piaget's second major implication for education.

> "If social cooperation is thus one of the principal formative agents in the spontaneous genesis of child thought, it is an imperative necessity for modern education to make use of this fact by according an important place to socialized activities in the curriculum." (Aebli, 1951, p. 60)

This teaching format requires the presence of two people for each class: one for small group intensive teaching, generally the teacher; and one for supervision of the large group, generally a teacher's aide. Two classroom areas are also required. One is a work-play area that is large enough to accommodate twenty-four children engaged in a variety of activities. A smaller room set apart from the work-play area is used for learning sessions with groups of four children engaged in the sequential curriculum activities. The small group sessions last from 20-30 minutes each, determined by the developmental level of the group, and meet every day. This insures that the teacher will have intimate and continuing knowledge of each child's progress through the different content areas and developmental levels of the sequential curriculum.

This kind of physical arrangement allows for both heterogeneous and homogeneous grouping of children. The large classroom provides opportunities for all children to work and play together in activities which they define and structure. It contains a supply of games and activities which either reinforce, extend, or expand upon what is taking place in the small groups. Children are free to move from one activity to another. A teacher or assistant is available to give the child just enough help to send him on his way. The children are free to work together or alone in their explorations of and experimentations with the games and activities.

The small group work area facilitates the control of extraneous stimulation. The room is nearly barren except for the learning materials. The child's attention is drawn to the materials and the teacher rather than to distractions in the room. The floor is the work space. This appears to be a more comfortable arrangement for the young child as it will accommodate more freedom of movement than that allowed by a table and chair.

In the small group sessions considerable planning and effort are expended to create an atmosphere conducive to learning. The other children must show the learner (player) respect by being quiet so he can "think with his brain" (make observations and organize his information before responding). With such an emphasis it soon becomes apparent to the child that he is important and what he is trying to achieve is worthwhile.

Curriculum Materials and Content of the Learning to Learn Program

The Learning to Learn Program curriculum materials constitute a sequenced program of guided learning experiences that elucidates the sequence of mental development. The progression of the curriculum materials insures that a child understands and builds upon this understanding. It also possesses a continuity that helps a child to build upon his learning experiences. Having learned one thing helps him to learn and master something else.

A unique feature of these program materials is the highlighting of the learning process. That is, they focus on the steps or sequence through which the child comes to terms with a challenge or problem. Crucial to this process is the development of delay, reflection, control of the direction of attention, and planning. Each of these is an integral part of the learning process and influences the course of events in a given learning situation. What gradually emerges (there is variability from child to child) are flexible strategies for dealing with challenges and problems.

The Learning to Learn Program requires that the materials employed to teach the young child be flexible and adaptable to different developmental and learning levels. The choice for something to motivate, stimulate, and appeal to children was the use of games or a game atmosphere. The games were developed on the basis of their ability to stimulate thinking and the generation and expression of ideas. They are flexible enough to be used by slow children as well as the very bright and can be made either simple or complex.

The newly developed games and materials for the experimental program were made to meet the following criterion: 1) they had to appeal to the child and evoke sufficient curiosity to get him to try them; 2) they had to be interesting enough to the child to keep him playing; 3) the child had to understand the material so that he could feel sure of what he was doing and working toward; and 4) the goal that the child was working to reach had to be clear to him and he had to know when and if he was making progress toward it.

The tasks of the games were designed to be at the child's level of understanding, and the play orientation gave the child an opportunity to try things out on his own. The children were not flooded with information in an attempt to overcome their handicaps, but rather were given a minimum of information to use in a variety of ways. Basic ideas were repeated, each time extending and expanding the uses to which they could be put and the child was encouraged to verbalize his knowledge. The materials place a major emphasis on manipulation, exploration, and experimentation which result in the stimulation of thinking, and reasoning, and in making judgements when the outcome is uncertain. Success comes from thought preceding action, internal conversation, delay, attention, and concentration.

The activities are designed to give the child a chance to see the [illegible] for which he is striving. In the process of moving towards this [illegible] he receives feedback on his progress in that direction. Thus, [illegible] motivation and interest in learning remain high. The games and activities involve the child in thinking and reasoning by forcing him [illegible] draw upon past experiences and information to solve a problem or make a decision. This builds his self-confidence and makes him more independent. His greater maturity is evidenced by increased reliance upon his own resources and efforts and lessened dependence on other persons. He benefits by developing and strengthening achievement skills and by experiencing the satisfaction of independent accomplishment. The games employed in this program were constructed around five content areas (clothing, food, animals, furniture, transportation) and chosen because examples of this content are familiar to children of all socioeconomic backgrounds and because they are readily available as real or miniature three-dimensional objects.

By beginning with a few examples of each content area and gradually expanding to include more members of the class, it was possible to develop a variety of games and activities, each of which is one step beyond the previous one and each incorporating the experiences and knowledge acquired by the child. Each of the five areas is sequenced in such a way that it is revisited and repeated in a variety of ways. Each time, however, the game or activity moves one step beyond the real and the concrete toward the abstract. The real orange, for example, is replaced by a picture of an orange as the only stimulus, and finally, the games are highly verbal and require statements about an orange. Every game or activity actively engages the child in some kind of interplay of manipulation, perception, and verbalization.

This gradual transformation of overt action into mental operations is a direct consequence of Piaget's key tenet that stable and enduring cognitions about the world come about only through a very active commerce with this world on the part of the knower (Flavell, 1963, p. 367).

The program gives the child an opportunity for the development of strategies of gathering information, problem-solving, and decision making. The skills and concepts children acquire are as follows:

1. Information gathering and processing through the use of all the senses.
2. Observation, identification, and labeling of objects.
3. Attention to and concentration on attributes that discriminate one object from another (what makes a pear a pear).
4. Classification.
5. Classes and sub-classes.
6. Identification and classification on the basis of reduced clues.
7. Encouragement in the use of guesses and hunches.
8. Decision making.
9. Use of past learning to make decisions.
10. Problem solving.
11. Reasoning by association, classification, and inference.
12. Anticipation of events and circumstances.
13. Expression of ideas.
14. Imagination and creativity.
15. Conventional (in contrast to idiosyncratic) communication.
16. Operations on relationships.
17. Exploration of numbers and space.

CHAPTER III

A Description of the Learning to Learn Program

This chapter was a joint effort of the authors and Dr. Herbert Sprigle who developed the Learning to Learn Program. This chapter deals with the translation of the theoretical foundations of the program discussed in the previous chapter into the practical applications used to teach children to become independent learners. Although some of the theoretical concepts of Chapter II are repeated in this chapter; in each case they are expanded so as to be more practical.

The Conceptual Model of the Learning to Learn Program

Children must learn to learn. The Learning to Learn Program was evolved to help them do this. It contains a clearly defined set of measurable learning behavior competencies and the variables that correlate with that behavior. By holding the teacher responsible for the orchestration of these variables, the most difficult problem of individual differences in children is managed successfully.

There is one myth that persists in early childhood education as if it were a theory backed by weighty evidence and unamimous consensus: and that is - do not place a child in a situation he has not drifted into on his own and do not put before him an activity he has not initiated himself. The implication is that the child is a delicate commodity who is easily injured.

Children are just not that brittle and are better characterized as flexible and plastic. They can assimilate activities not of their choosing without ill effects provided there are other compensations for the absence of choice. One compensation is the uniqueness of classroom experiences compared to activities at home or in the neighborhood yards or streets.

The limitations of the traditional kindergarten program suggested the need for a new direction in early childhood education. It seemed worthwhile to design and operate an early education program which: 1) gives the teacher and child a sense of purpose and direction, 2) makes the teacher responsible for the emotional-social-cognitive development of every child; 3) recognizes individual differences and adjusts teaching strategy to each child's rate and level of learning; 4) provides a continuum of learning experiences to match the child's rate and level of learning; 5) makes the child aware of the learning process and how to utilize himself to learn, and 6) provides continuity with first grade.

The program was based on three premises regarding children and their education. First: the educational process begins in early childhood. An organized, systematic, sequential curriculum and curricular materials should be introduced at this point. Second: the first few years of school should provide the child with opportunities to learn to learn. These opportunities are of an emotional-social-cognitive nature. Third: every child has an inner drive toward maturity, increased competence, and mastery over his environment, and looks to adults for behavior and attitudes which channel this drive.

The teacher is an integral component of the Learning to Learn Program. It is vital that she embody love and invite trust and security. The example she sets of human interaction is the foundation on which learning behavior competencies are built. A teacher's expression of love is realistic and appropriate to her professional role and function. It takes the form of sensitive care about and responsiveness to what the child is saying, feeling, thinking, and doing. The Learning to Learn Program is built upon this foundation of human interaction. The following principles shaped the design and development of the program:

1. The likelihood of meaningful and permanent learning is advanced if the child has the opportunity to be an active learner. From the outset he should be given a major share of work and responsibility. Active participation is achieved through active manipulation of objects and an open, spontaneous discussion that is an exchange of ideas between teacher and child.

2. Practically all learning has social implications. The teacher and curriculum are together the means of promoting concurrently socialization and cognitive development. The spiralling curriculum provides the stimulus, and the teacher the social setting for sharing information and ideas, making decisions, and solving problems.

3. The child's identity, self-esteem, and social status are shaped by the contributions the child makes to himself and others. By working successfully on his own, by helping another child with a problem, by sharing common material, the child sees himself as a successful learner, teacher, and friend.

4. Differences in ability and mode of learning must be accounted for. The eyes and ears are not the only source of knowledge or problem-solving, or even the best source for some children. Knowledge can be acquired, thinking stimulated, and problems solved by the sense of touch, smell, and taste. And for young children, learning of this nature can be more fun and challenging if they are given the additional task of communicating these discoveries to an uninformed listener. So, the opportunity for this kind of learning is built into the game format.

5. Cognitive activities, learning attitudes and strategies will more likely become a part of the child's permanent learning behavior if there are follow-up opportunities for their use in his daily life. Also the teacher and curriculum must provide additional opportunities in class for practice and application. Learning of any complexity is not achieved on the first, and seldom on the second or even the third exposure. And the practice must be fun, pleasurable, and challenging to the child. The game format, the element of the unknown, and the rising difficulty level are features of the curricular materials which reinforce learning.

6. Inner satisfaction and feelings of adequacy develop when the curriculum is structured so that the child can cope with and master each new learning experience. The confidence gained from each success improves his performance and stimulates his growth toward independence and responsibility.

7. Learning experiences will have lasting benefits when these experiences are properly timed and structured and offered to young children on a continuing basis. There is no guarantee that learning of any substance or complexity will occur simply through random *experiencing* and *doing*. Young children understand and use symbols and concepts effectively and appropriately only when there has been a gradual progression (with practice each step of the way) of exposure to concrete, representational, and symbolic stimuli. Teachers cannot make assumptions concerning prior development and a home curriculum. The only way to be certain of every child's progressive development is to organize and plan a curriculum to which every child is exposed.

8. For lasting effects the school should provide for the active involvement of parents and encourage their commitment to the objectives of the program.

The teacher must bring together new affective, social, and cognitive opportunities and weave them into the fabric of the child's previous experiences and prior development. One area such as the cognitive cannot be advanced independently of other areas such as the emotional. Cognitive skills have personal and social consequences. Feelings of trust and security have cognitive and social consequences. It is the teacher's responsibility to serve the child's need for affective, social, and intellectual competencies rather than to serve the teacher's desire for control and discipline. In the Learning to Learn Program the teacher's goal is to develop a set of clearly defined learning behavior competencies in children whose general characteristics encompass self-management, motivation, learning strategies, and social responsibility.

Components of the Learning to Learn Program

Through eight years of research and experience with teaching young children we have come to the conclusion that language and cognitive activities must be grounded on concrete firsthand experiences that are properly timed and paced in order to benefit later learning and development. More important, however, both must be nurtured within a human context solidly based on mutual trust, respect, and confidence. Furthermore, this human involvement must be personal and on a daily basis. Expressed in equation form, educational competence in young children is equated to the following components: child behavior + teacher behavior + teacher-child interaction + situational variables + motivators + communication process + a parent-school program = educational, social, and affective competencies in children.

Human involvement is crucial to the development of the educational competence to which this project addresses itself. Inspection of the research and evaluation data presented in Chapter V indicates that our work has made a significant contribution to early childhood education.

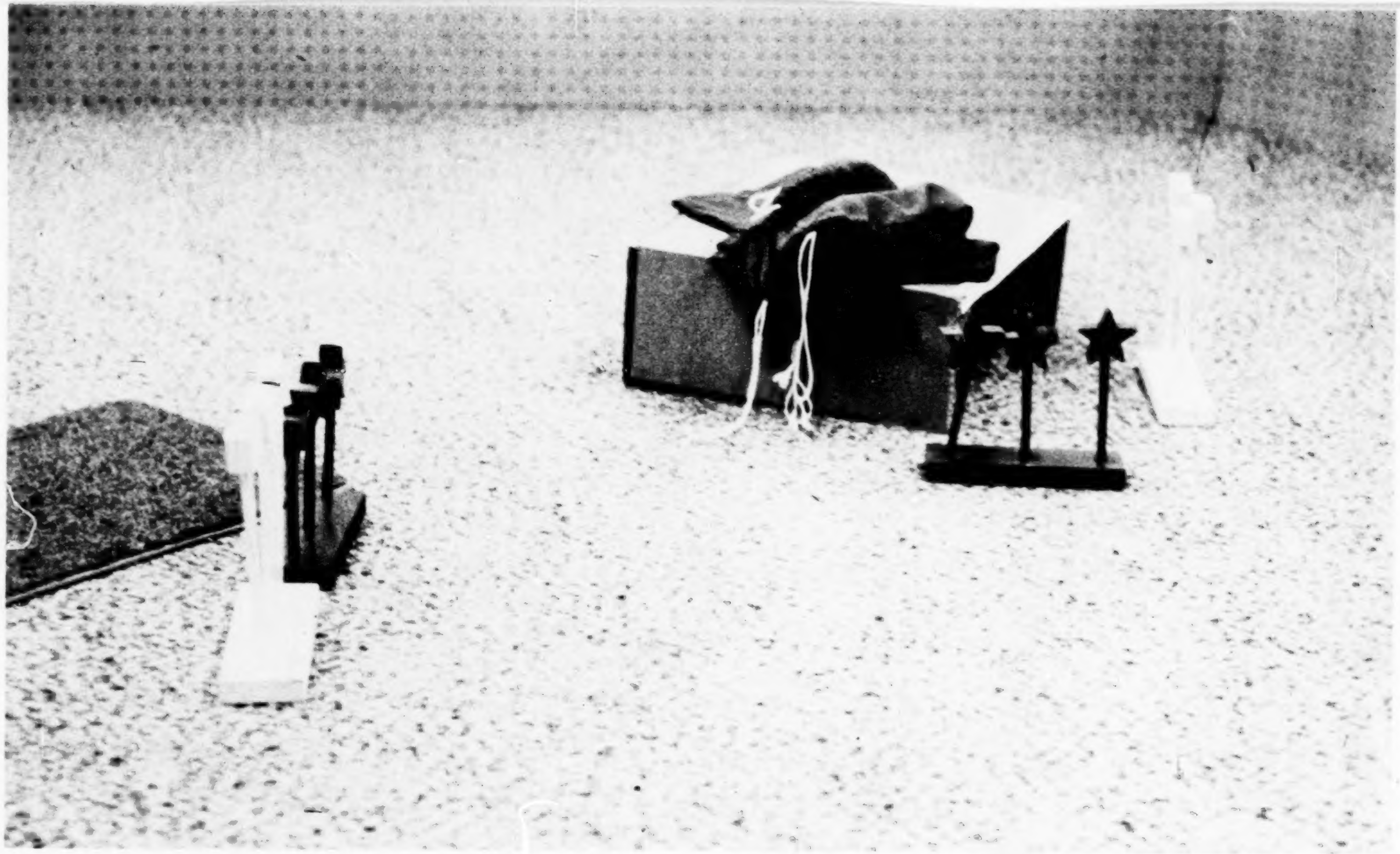
Careful analysis of our research and observations at the Learning to Learn School revealed seven components of the Learning to Learn Program which promote the development of successful attitudes and values in children. The variables are:

A. Curriculum and Curricular Materials
B. Physical and Spatial Arrangements
C. Child Behavior
D. Motivators
E. Teacher Behavior
F. Communication Pattern
G. Parent-School Program

A. Curriculum and Curricular Materials

The Learning to Learn Program emphasizes:

1. An organized and structured curriculum focusing on:
    a. developing meaning through first-hand, practical experiences.
    b. giving the child an opportunity to learn through many modalities.
    c. giving child and teacher a sense of direction and purpose.
    d. showing the child how old and new knowledge is related in an orderly and organized fashion: learning hierarchy.
    e. providing a continuum of learning experiences to match the child's rate and level of development.



MANIPULATIVE LEARNING MATERIALS PROVIDE OPPORTUNITIES FOR ACTIVE PARTICIPATION.

2. A core curriculum that can be generalized to any day care or early childhood program, focusing on:
    a. knowledge of children from different cultural, social, and economic backgrounds.
    b. establishing and nurturing an adult-child relationship which enhances emotional-social development.
    c. individual differences: how these differences are manifested by fast developing and slow developing children and how trainees can use this knowledge for each child's benefit.
    d. direct and indirect efforts by the adult to change and guide behavior (discipline) through the unique arrangement and management of the learning environment which gives the child a clear understanding of personal and property rights.
    e. change in emotional-social development over time as a function of a to d.

The development of the curricular materials was shaped by our knowledge of the young child's abilities and level of functioning, and by the principles of the program mentioned above.

Foremost in our thinking was the importance of the learning process. The content of the curricular materials served only as a vehicle for enhancing this process. The child was seen as an active learner.

The Learning to Learn curriculum is based upon the theoretical framework that intellectual development proceeds through an orderly sequence of motor-perceptual-symbolic phases with their periods of transition. The design of the curriculum is based on the proposition that educationally high-risk children show a developmental lag in all phases of development and it just so happens that the symbolic phases is the most obvious, especially to middle class psychologists and educators. Less conspicuous than deficiencies in language and concept formation are poorly conceived body image, relationship of the body to things in space, inability to relate one object to another object, and a failure to organize and integrate these relationships. The curriculum emphasizes not experiences per se but the making of keen observations about these experiences. It is derived from the conceptual framework that the abilities and skills the child needs to cope with the educational and social experience of our public school systems are themselves the product of a long series of learnings that have their beginnings in the child's awareness of his own body and how it functions. From extensive experimentation with his sensory and movement patterns the child learns first about himself and then about himself in relationship to objects in space. The curriculum puts special emphasis on visual, tactile, motor, and verbal judgements, as well as decision-making where the outcome is uncertain.

The uniqueness of this curriculum lies in the introduction of new techniques, approaches, and materials which require the child to manipulate, explore, and experiment. They give the child an unprecedented opportunity to make keen observations and organize his thoughts about the environment, to communicate his ideas to others effectively, to solve problems that have real meaning to him, and, finally, to know himself. Through a sequence of carefully planned experiences, the curriculum moves from motor manipulation to the building of perceptual imagery and on to symbolic experiences through the medium of interesting and challenging games and activities.

The curriculum is designed to progress from low to high (more complex and abstract) in motor-perceptual-symbolic skills and also to move across these dimensions in a sequential fashion. In the beginning,the emphasis is on the development of motor and perceptual-imagery skills and processes with the minimum of verbal interaction necessary. This stage is gradually superseded by a predominantly verbal emphasis which stresses the understanding and use of language, auditory discrimination, and concept formation. This part of the program has many games and activities which encourage the child to generate his own ideas and modes of expression.

Most obviously our program provides preparation for what lies immediately ahead for these children i.e., the development of readiness skills. More important, however, this experimental curriculum has the ambitious goal of helping them learn to learn, to think, to develop self-confidence and self-esteem through more effective and efficient coping behavior, be it of a social, personal, or academic nature.

As we have seen, our major assumption is that cognitive growth and development proceed in an orderly sequence with periods of transition. It was further assumed, on the basis of past research, that the developmental sequence of cognitive functioning proceeds from motor to perceptual to symbolic aspects (Bruner, 1960, 1966; Hunt, 1961; Piaget, 1963). In the motor stage the child's first cognitive working concern is the physical manipulation of the world. By establishing a relationship between experience and action, the child becomes aware of certain superficial features by which he can identify the objects in his experience. Through the perception of the world around him he learns the relationships between the various things he observes. To discover these relationships he must be given the opportunity to perceive, recognize, and categorize. This leads to the stage of symbolic formation which enables the child to abstract about objects and ideas. Concurrent with the acquisition of the ability to communicate verbally comes the capacity to recall the past, represent the present, and to think about the future and the "possible." Language becomes a vitally important tool for thinking, reasoning, and communicating things that the child has not said or heard before.

The ultimate test of a theory such as this comes with its translation into practical content and its application in the everyday world of children. A program was needed which would provide the necessary motivation, stimulation, and appeal to get the child moving. To keep a child motivated, interested, and involved, he must know where he is going. It is also important that he knows where he is in respect to this goal. Finally, to be a meaningful experience, the child must know how he is doing in his progress toward the objective.

The content of the Learning to Learn curriculum was carefully selected according to its relevancy to the child's experience, its familiarity to children of all socio-economic backgrounds, and its availability. While the Learning to Learn curriculum has been carefully organized and sequentially developed, the goal of this structuring is not to control the teacher, require specific teacher behavior, or produce narrowly defined specific responses by the child. Rather, the school curriculum serves three important functions: it helps the child acquire and organize knowledge, develop his learning strategies, and to become aware of a learning hierarchy.

The primary purpose of the Learning to Learn curriculum was not to fill the child with facts and information. Rather, the curricular materials, the content of which was common to all children, were organized and structured:

1. To develop meaning through first-hand, practical experiences.
2. To give children the opportunity to learn through many modalities.
3. To show children how old and new knowledge are related in an orderly and organized fashion: a learning hierarchy.
4. To give children and teacher a sense of direction and purpose.
5. To provide a continuum of learning experiences to match the child's rate and level of development.

Both the curriculum and curricular materials underwent continuous reassessment and revision as the test data and teachers' evaluations indicated areas of weakness and problems with language and materials. The revision and expansion of the published material (Sprigle, 1960, 1969) reflect this sensitivity to field testing results and to judgements of the teachers who have used the material over the years.

The focus of the Learning to Learn curriculum was on the learner and the learning process, with the content serving only as a vehicle. The content was, nevertheless, carefully selected according to its relevancy to the child's experience, its familiarity to children of all socio-economic backgrounds, and its availability.

If the Learning to Learn curriculum were a natural means of developing learning strategies, the game-like activities of the curriculum would interest, motivate, and stimulate the child. Games keep a child interested and involved because they let him know where he is going. They inform him where he is in his progress toward a goal.

The games are sequenced so that each step incorporates the experiences and knowledge already acquired by the child in a previous game but is one step ahead of the previous one. At each sequential step the game or activity becomes less concrete and more abstract. Every game or activity engages the child in an active interplay of manipulation, perception, and communication.

There is both a language component and a numerical and spatial component (See Appendix) to the Learning to Learn curriculum. The language component was constructed around five content areas - clothing, food, animals, furniture, and transportation. The number and space component utilizes the following materials: sticks which vary in size and color, animal dice, and animal cards. The materials of the Learning to Learn curriculum change in use from concrete to manipulative objects, progress to a higher level of pictorial representations, and culminate in an arrangement of stimuli and experiences in a logical spatial and temporal order. This last level was designed to encourage self-expression and effective communication of thought processes.

The organization of the Learning to Learn materials enhanced the learning process and allowed for reinforcement and reward. The same format of organization was maintained through each of the five content areas. The content changed but the format for the sequence of games remained quite similar. For example, the unit on transportation began the same way as the unit on animals, with miniature objects of that category which the child manipulated, explored, and talked about. Both units were revisited, but at a higher level of complexity, using the same game format and organization. Through this consistency of organization the child became comfortable using the materials and developed a set of learning attitudes and behaviors which were continuously reinforced. He began to know what to do and how to do it even though there was a change of content. He began to know that each successive game - whatever the unit - utilized the knowledge, strategies, attitudes, and learning sets of the preceeding games but took them one step farther.

The content of the games of the four-year-old Learning to Learn curriculum (first year) consists of concrete, three-dimensional objects which the child can manipulate and explore. Colored blocks, shapes, patterns of colors and shapes, balls, boxes, cylinders and sticks that join, tunnels, mazes, sets of objects to identify and count are a few examples of the content.

The games in the five-year-old curriculum (second year) are divided into language and number and space.

The content of the first grade curricular materials serves two major functions. One is to stimulate and extend the experiences and knowledge acquired in the five-year-old program. The second function is to apply and strengthen the learning behavior, attitudes, and knowledge of the learning process acquired the previous two years. The games, activities, and materials are divided into a language area and math area. The language area involves reading, writing, listening, spelling, art, social studies, and science. The content includes five-year-old curricular material (used on a higher level), picture and word games, art material, experience charts, and crossword puzzles. The content of the math area includes Cuisenaire rods, relationship boards, number boards, dice games, card games, and plastic tokens.

The three-year curricula provide the child with continuous opportunities to develop competencies in the following areas:

1. Information-gathering and information-processing through the use of all the senses.
2. Observation, identification, and labeling of objects.
3. Sensitivity to the structure of a stimulus (what makes a pear a pear).
4. Classification.
5. Classes and sub-classes.
6. Selective listening.
7. Rules of strategy in probability situations.
8. Use of intuition and hunches.
9. Decision-making.
10. Use of past learning to make decisions.
11. Problem-solving.
12. Reasoning by association, classification and inference.
13. Anticipation of events and circumstances.
14. Expression of ideas.
15. Imagination and creativity.
16. Communication skills.
17. Operations on relationships.
18. Exploration of numbers and space.

The behaviors a child needs to learn are themselves the product of a long series of learnings that have their beginnings in sensory-motor experiences. The four-year-old curriculum places a heavy emphasis on the motor manipulation of concrete objects and on language for expressing ideas and reporting observations about them. The five-year-old curriculum begins with motor manipulation of concrete objects and moves to perceptual experiences, using pictures of the real objects, and progresses to complex perceptual experiences and a heavy use of symbols (language) to report observations, generate ideas, and explain decisions.

The developmental curriculum provides a flexibility that is essential if a program is to come to grips with individual differences. It provides opportunities for children who reveal different levels and rates of learning, as well as children who differ in mode of learning. The child is asked to gather and report information acquired through the use of only visual, auditory, tactile, or kinesthetic cues. At a more complex level, a combination of senses are used. Sequential curriculum structuring ensures that every child, regardless of natural endowments, adequacy of prior development, or "home curriculum", has a firm foundation for cognitive achievement.

The sequential curriculum serves to organize knowledge for the child. This does not mean it controls the teacher or requires specific teacher behavior or produces narrowly defined specific responses by the child. Rather, the child begins on a concrete level and proceeds to representational forms of these concrete objects and then on to the use of symbols and concepts. Children learn to build a bridge between symbols and their referents by their own observations and manipulation of objects in association with language.

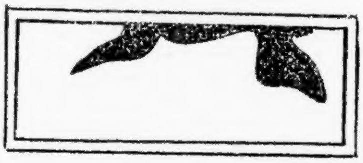
Efficient learning is more than collecting bits and pieces of information dispensed by a teacher or playmate. Random, disconnected knowledge is very difficult to retrieve and use, and consequently has a short life span. On the other hand, information that fits together forms rich associations that aid retention.

A closely related second function of the Learning to Learn curriculum is to develop an awareness of a learning hierarchy and its practical application. The child becomes increasingly aware that what he is learning today is somehow related to what he learned yesterday. A new piece of information or problem to solve can spark a string of rich associations in the child's mind that will result in a new link-up of knowledge or the solution to a problem. For example, in order to move forward in one of the Learning to Learn games, the child needs to know the category of celery. Right offhand he does not know the category of celery, but he does know from previous curricular activities that celery is related to a carrot and a carrot is a vegetable. The child on a slower level can name the right category with the aid of picture cues unnecessary to a faster-developing child.

A third function of the curriculum is to develop an awareness of the learning process. The focus is not on a right or wrong answer or the end product, but rather on the steps or sequence through which the child comes to terms with a challenge or problem. It is essential that he develop delay of judgment, reflection, concentration, control of the direction of his attention, and planning. Each of these abilities is an integral part of the learning process and influences the course of events in a given learning situation. What gradually emerges are flexible strategies for dealing with challenges and problems.

The development of learning strategies is a fourth function of the curriculum. The learning process and learning strategies, not the memorization of content, prepare children for what lies ahead. Strategies, besides being a source of practical help, contribute to motivation, independence, self-esteem, and social status by heightening the feeling of competence.

A few of these strategies can be summarized. One is reasoning by association such as in the example cited above of the celery and carrot. A second strategy is the making of inferences from a series of observations. For example, the group is shown only one-third of a picture of an unknown object as in the following illustration.



The child must first identify the category of this object. This requires not only alertness, fine discrimination and sensitivity to perceptual details, but skillful mental organization of bits of information and rich associations. He must hold his own ideas in mind and weigh them against the ideas of the group. Skillful inquiry by the teacher to get the child to verbalize his thinking and reasoning helps the child in this effort.

Learning strategies culminate from a long, slow, and patient process during which the teacher has encouraged sharp observations, concentration on reduced perceptual cues, and focused attention. She has supported the child in his thinking through and generating of ideas, and in his looking ahead. Teaching a child to reflect and delay before responding is vital. The Learning to Learn teacher has used herself as a model of patience and tolerance and asked group members to imitate. She has been successful in this effort.

The features of a developmental curriculum for the teacher and child are briefly summarized as follows:

1. Concrete, manipulatory objects and materials to develop understanding through first-hand, practical experiences with which the child has already had personal contact at home.

2. Small steps to accommodate a wide range of individual differences.

3. Games and game-like activities for appeal and attraction. They are of personal interest to the child because of familiarity with the contents.

4. Use of all modalities to strengthen learning and accommodate differences in talent and mode of learning.

5. Flexibility of use provides the opportunity for teacher input and child input and discourages rigid instruction. Heavy emphasis on child-teacher and child-child communication.

6. A balance of individual effort and persistence and group cooperation.

7. Maximum of initiative and participation by the child and the minimal but timely participation of the teacher.

8. A sense of purpose and direction. There is a beginning and end and the child can monitor his own progress toward the goal. Each child is responsible for solving his own problem. He can accomplish this on his own or find a source of help and select the information he needs.

B. The Physical and Spatial Arrangements

The physical and spatial arrangements of the Learning to Learn Program are another major ingredient essential for its success. Two classroom areas are necessary for the four- and five- and six-year-old programs. One is the regular large classroom and the second is a space where the teacher can take two, three, or four children. It can be an adjoining room or a hallway, the only requirement being that it is as free as possible from visual and auditory distractions.

The large classroom is equipped with a variety of materials selected for the contribution they make to the child's development. They are unstructured or semi-structured things which require the child to structure, manipulate, and explore. There are no mechanical toys which amuse and entertain in a passive, effortless way. The child, through his own efforts, must interact with the material.

In the large classroom during a daily one and one-half hour period of free activity the child has freedom of choice and movement. There are no rigid demands for orderliness and tidiness during this period but, at the end of this time, there is a general clean-up in preparation for snack and large-group activities. Everyone, including the teachers, works together to return the materials to their places.

The second classroom area is a hallway, supply, or clothes room that is free from visual and auditory distractions and protected from intrusions by classmates. This is where the curricular materials are used. Children display a wide range of individual differences in coping with and mastering these games and activities. To ensure that children learn at their own rate and level in a non-threatening atmosphere, they are grouped according to homogeneity of affective, social, and cognitive development. The four-year-olds are divided into groups of two or three children and the five-year-olds into groups of three or four children. At some point during the free activity period in the large classroom these groups go to the small classroom area, one group at a time. This occurs daily for periods of time that vary from 10 to 15 minutes in the fall to 20 to 30 minutes in the spring. Particularly the environment of the small group (session), maximizes the effectiveness of the teacher, enabling her to apply the motivators and implement the Learning to Learn curriculum. The conditions of the small group promote a frame of mind conducive to learning. The physical and spatial environment of the Learning to Learn Program should create an atmosphere of closeness and informality not provided by the conventional classroom. This atmosphere will promote self-awareness and sensitivity to peers, and should foster security, self-esteem, and other affective, social and cognitive benefits in children.

The primary function of the physical and spatial arrangements of the small group setting is to point up to the child how human interaction and personal involvement are closely linked to learning and must work in harmony for personal and group advantage. This set-up offers experiences which are not available in a large classroom. This learning environment and atmosphere is arranged and managed according to the following objectives:

1. To establish a "mental set" for learning. This is a special place and a special activity with special materials which require a specific set of behaviors and attitudes.

2. To promote learning as a personal experience. This is a place to work on a task and with materials that require child-active participation, effort, persistence, and independent thinking. It requires a restriction of movement and a constriction of work space.

3. To promote learning as a means of self-identity and self-confidence. The closeness with a teacher whom he trusts gives every child the opportunity to find out who he is and what he can do. The teacher has control over the timing, pacing, and quality of the sequence of the affective, social, and intellectual experiences of each child. These sequences shape the child's identity and confidence.

C. Child Behavior

We now come to the third major component in the Learning to Learn Program - child behavior.

All children enter day care, nursery school, and other preschool arrangements with a set of behaviors. They are characterized by physical movement, verbal and non-verbal communication, self-centeredness,

THE CHILD WHO LOOKS AT HER PLAYMATE AND PATIENTLY LISTENS INVITES FRIENDSHIP AND COOPERATION.

A CHILD'S VERBAL AND NON-VERBAL BEHAVIOR INFLUENCES A RELATIONSHIP AND SHAPES THE BEHAVIOR OF THE PLAYMATE.

slowness and clumsiness, attraction to stimulation and distraction from concentration. These behaviors stem from genetic endowment and environmental experiences, with the latter substantially influencing the quality, intensity, and frequency of behaviors.

In the classroom the following specific behaviors of a child can be observed and measured. They are:

1. Movement - child frequently uses arms, hands, legs, body
2. Noise- makes vocal noise or noise with objects
3. Impulsive verbal behavior - speaks out of turn or at any time
4. Controlled verbal behavior - speaks when there is a definite listener
5. Friendliness - smiles, shares, cooperates
6. Hostility - defies, resists
7. Aggressiveness - grabs, hits, pinches, etc.
8. Clumsiness - moves or speaks slowly
9. Reaction to stimulation - anything or anybody gets his attention
10. Reaction to distraction - anything or anybody interrupts his concentration.

It is the small-group times which bring about a change in frequency and direction of some of these behaviors with which a child enters school. Also there comes a change in self-concept, group and social responsibility, respect for self and others, motivation toward and interest in learning. Only in the small-group learning environment does the teacher have control over those variables which bring about positive change in entering behavior. The first week of school is devoted to getting the children accustomed to the newness and strangeness of school. Most important, though, the teachers use this opportunity to make detailed observations of the children. What materials does a child use and how does he use them? How does he spend his time? How does he relate to the teacher and other children?

The teacher uses the information from these detailed observations to plan her small groups. Children who appear to be at a similar level of development and rate of learning are placed together. Children with high intellectual potential but lagging in emotional-social development are usually placed together. Because of the interpersonal problems of some of these children the teacher sometimes reduces the group size from four to three members. The teacher refines her observations as the children work with the materials in the small group. A child is moved to another group if the child's developmental level and rate of learning changes or is different than her original estimate. Then too some children are more talented with one kind of material than with another. Continuous regrouping permits them to work on one level with one kind of material and at another level with a different material.

CHILDREN'S EXPERIENCE IN THE LARGE CLASSROOM ARE CHILD INITIATED, INFORMAL AND PLAY ORIENTED.

THE LARGE CLASSROOM EXPERIENCE IS THE TESTING GROUND FOR BEHAVIOR SEEDED IN THE SMALL GROUP EXPERIENCE.

For example, it was found that some boys who fit into a slow group with materials that focused on concept formation and language were in a fast-developing group with math materials that required knowledge of length of colored sticks and their relationships.

Even though the game approach is appealing and challenging, some children need time to get acquainted with a new situation and new material. Some children come into the small groups ready to get underway with what the teacher has in mind. Others need time to get acquainted with the materials. For still others the materials stimulate personal experiences they have had with the material. The materials, in the case of a few children, create interpersonal problems. The teacher works with each group in a different way. She permits each group to set the pace and makes use of a number of variables to guide this pace. She may use the same material to promote one group's cognitive development and another group's social or emotional development.

D. Motivators

Now we come to the fourth major component in the Learning to Learn Program - the motivators.

Motivators are of two kinds: respect of others and the "I'm somebody" feeling. The first kind pertains to rules of personal and property rights, and to the social responsibility that is necessary in order that each group member be a beneficiary. The other refers to a healthy self-image that comes with confidence, respect, individuality, and increased competence to cope with his environment.

The physical closeness and intimacy of the small groups where the teacher has ready access to all the variables is a decided advantage in helping her maintain the rules of personal and property rights. Through the skillful management of these variables the teacher conveys, however subtly, two messages. One is that you can not hurt the teacher (physically or mentally) or another child; and you can not destroy classroom materials or something that another child has made. These two rules protect not only a potential victim but also the attacker. The overt expression of hostile and aggressive impulses which result in mental or physical injury and destruction of property has a negative impact on the attacker's self-respect and the respect of his classmates.

The teacher makes clear the distinction between the right to have feelings and the right to act on them at someone else's expense. Children occasionally refuse to participate in an activity because they are angry or sad. Most of the time they are angry or sad for reasons unrelated to school. They come to school upset over what happened at home that morning. Other children refuse initially to enter into the small group games because they can not be first, or because they can not sit next to the

THE TEACHER IS A FACILITATOR AND EVALUATOR OF LEARNING.

teacher. And there are a few children who want to test the teacher. They will resist or appear to be sad just to see what the teacher will do. The teacher acknowledges their right to have these feelings and gives them time to overcome them. For most children the anger or sadness wears off as they are lured by the appeal of the game or the unobtrusive nudge from the teacher. Children will give the teacher cues when they want to join the group. With the finest of social finesse she helps the child save face and in the process win his respect and confidence. At an appropriate time she will probe to see if the child is ready to join the group. It might be indirectly like, "Victor, Loria needs help in finding a vegetable, can you help her?" or she might matter-of-factly say, "It's Victor's turn." Another child might reply that Victor is mad and doesn't want to play. The teacher might reply, "Maybe he feels better now and wants to play."

Behavior that is disruptive can also be handled in an unobtrusive fashion which shows respect for the child at the same time it allows the child to shape his own behavior. She might say to Victor - who is using his stick as an airplane and being disruptive with the loud noise of the motor - "Victor is almost ready for his turn with the spinner." In this way the teacher is giving Victor a chance to control his own impulses at the same time as she is giving him a chance to work toward the mastery of a task. Victor is the decision-maker; he is acting autonomously. The result is that Victor feels good about himself, and the teacher feels good about having given him the chance.

By recognizing the wishes and feelings of a child, the teacher is modeling the affect and social sensitivity that she wishes the children to develop. Gradually, the children form a similar value system which they manifest through announcements like, "Eric does not want Loria to help him", "Allen is making so much noise I cannot think."

The second kind of motivator, the "I'm somebody" feeling, pertains to the child's self-image. A child's positive feelings about himself are advanced when he lives and learns in an atmosphere of trust, security, and love. It is the teacher's duty to establish and maintain such an atmosphere. The one essential component of this atmosphere is for the child to be able to predict what is going to happen to him. The child can predict the teacher's behavior and her relationship with him. He knows that when he talks, she and his classmates will listen. It is ego-building for a child to know that he has the attention of the group and that his ideas and views are as important as those of the previous speakers. The knowledge that this is a safe place is a comforting feeling. When he knows his personal and property rights will be protected, his attention and energies can be concentrated on learning and mastery of his environment. He can predict that he will not be hurt physically or mentally because she is right there to back up what she says. He knows that his right and responsibility to participate will be protected against ridicule and humiliating attack from others.

There is comfort and security in knowing that one's weaknesses and self-doubt will be held in confidence by the teacher. When confronted with something new and different the child knows he has the option of either participating or sitting and watching. On occasion, he needs a little time to get oriented and to make sure he can cope with and eventually master a new and challenging task. He is secure in the knowledge that his choice to survey the situation will be respected by the teacher. He can trust that she will not expose his self-doubt or criticize him in front of his peers.

Being able to predict and thus have direct influence over what happens to him is vital to the development of a healthy self-image. Over a period of time the child develops a sense of trust in himself. He begins to believe in himself because the teacher believes in him. This is a source of strength and gratification. Strength because of his confidence that he has what it takes to influence what happens to him. Gratification in the knowledge that he has more options open to him and he is freer and more independent to exercise them without help from the teacher. All of this happens without sacrifice to his individuality. He does not have to guess the answer that is on the teacher's mind nor does he have to agree with the ideas of another child. The child begins to notice that it is not the answer that counts but how he arrived at the answer.

Distinctiveness of self and a sense of identity comes from knowing that these are "my" materials; this is the product I achieved with them, and I arrived at it in a way different from my friend.

Timing of the teacher's behavior in regard to motivating children is an important consideration. For optimal effectiveness her responses must be coordinated with the concrete behavior of the child. (However, often she can even anticipate a certain behavior and prevent it from occurring). If her response is delayed (which is what happens most of the time in conventional preschool programs) it loses its effectiveness and possibly has adverse effects. Children require on-the-spot consequences where they can link up their behavior with teacher behavior. A teacher's arrival on the scene after one child has violated another child's personal or property rights is about as effective as the mother who has the father punish the child when he returns from work for behavior that occurred earlier in the day. The teacher's physical closeness to the child in the small-group setting ensures an immediate connection between her response and the behavior which prompted it.

A hierarchy of teaching techniques to motivate children's behavior is listed below:

1. Enlisting child's help
2. Teacher as sounding board for child's comments
3. Distraction
4. Focus on preparation for next activity
5. Re-focus attention on activity or objective
6. Release of tension through laughter
7. Arouse curiosity in activity
8. Surprise at action
9. Focus attention on one child's discovery or activity
10. Flexible rules to accomodate child's handicap
11. Ignoring behavior
12. Soft touch accompanied by statement of the rule
13. Verbal statement of the rule
14. Face-saving second chance
15. Expressing annoyance
16. Use of group censure or pressure
17. Exclusion from participation
18. Exclusion from group
19. Physical restraint.

E. Teacher Behavior

A fifth variable of the Learning to Learn Program is teacher behavior. A teacher's knowledge of the other variables and their interdependency, and her ability to sequence, time, and pace them are crucial to the child's acquisition of learning behavior competencies. The quality of the teacher-child relationship is crucial to the success of the program. The teacher must be a model of the educational climate he or she is promoting. The role of the teacher of young children calls for a close person-to-child contact. The teacher will be physically and mentally closer to each child than is usually the case in traditional classrooms.

Of the seven variables (curriculum, physical and spatial arrangements, child behavior, teacher behavior, motivators, communication patterns, and parent-school program), the teacher behavior is the most crucial.

She is responsible for making it all happen. She has knowledge of those variables which develop learning behavior competencies and training in their use. The ability to sequence, time, and pace these variables is crucial to t[illegible]ld's acquisition of learning behavior competencies. Bringing [illegible] the right variables at the right time in the right amount [illegible]ain function of the teacher. The child's current behavior g[illegible]s teacher response. What the child receives from her depends upon what is happening at the moment and not upon pity and sympathy or disgust due to family background or parental pressures and expectations.

AN EFFECTIVE TEACHER IS AN ALERT AND SENSITIVE OBSERVER.

From the very beginning she must actively demonstrate that she is a source of trust, security, and love. This is the foundation on which she builds a balanced development and learning behavior competencies. Trust and security occur in the sense that the child can believe the teacher and knows that he is safe and can predict what will happen in their relationship. He knows his right to say what is on his mind and to make decisions will be protected against ridicule and humiliating attack from others.

The child can predict the teacher's behavior and her relationship with him. He knows that when he talks, she will listen to him. He knows his protests will be heard but that the teacher will also listen to the other child before making a decision. He knows that when he has a choice, it will be respected, and that when he dislikes something, it will not be forced on him.

Love occurs in the form of sensitive care about him as an individual. He knows she will have time for him every day and she will talk with him, not at him. Over a period of time the child develops a sense of trust and confidence in the teacher because her words and deeds are coordinated. She models the behavior she wants to establish.

It is not the child's effort, but the amount of work and effort on the part of the teacher that establishes the teacher-child relationship. The closeness she is able to achieve, and the type and frequency of child-teacher contact depends somewhat on the adequacy of prior development.

While she is intimately familiar with the child's background and knows something about his prior development, the child's current behavior, not his past, guides the teacher's behavior. She doesn't use her knowledge of the child to label his behavior or justify actions on her own part that would work against a healthy balanced development. For example, out of pity or an attitude that the child is inadequate or inferior, teachers frequently overlook behavior or fail to take a course of action. Or they label a child immature and then use the label to justify punitive action.

To establish and build upon a relationship that promotes a balanced development, the teacher is active and alert in an unobtrusive way. She knows some children are awkward in their attempt to make teacher or child contact, other children even resort to disruptive behavior, while still others are quite independent and turn to the teacher or peers infrequently. Even more important though the teacher also knows what to do and how to relate to children. She knows the tolerance levels of her children. For example, she can sense when Karl's excited play is about to turn into uncontrolled, aggressive behavior that will result in hurting another child or disrupting the play of others. She knows when and how to step in without

MULTI-SENSORY ACTIVITIES IN A GAME FORMAT STIMULATE AND MOTIVATE YOUNG CHILDREN.

A TEACHER WHO IS MENTALLY AND PHYSICALLY AVAILABLE IS BELIEVABLE.

THE SMALL GROUP EXPERIENCE PUTS LEARNING ON AN INDIVIDUAL BASIS.

A SEQUENTIAL CURRICULUM WITH SMALL LEARNING STEPS SERVES INDIVIDUAL DIFFERENCES IN RATE AND LEVEL OF LEARNING.

destroying his confidence or his esteem for her. She knows how to help a clinging dependent child help himself without having the child feel rejected.

Trust, security and love are not enough. It is not in the nature of the child to be content with words, a smile and a soft touch. Nor is this the way the teacher spends most of her time. Children also need activity, a challenge and an identity. The teacher spends most of her time orchestrating those variables which nurture these needs.

She is at the same time a facilitator and an evaluator. She provides those activities that will arouse the child's curiosity, challenge his level of ability and invite his active participation. Learning is advanced by creating a climate whereby the child is accepted as a unique individual whose ideas and thoughts are welcomed. Whatever the child's contribution, the teacher makes him feel good about it. The teacher is not a conspicuous, dominant figure who does most of the talking while the children sit by passively and listen. The communication process is two-way, between child and child or between child and teacher. Children talk more than the teacher. She is a member of the group who listens and observes, entering the discussion at appropriate times to clarify, inquire or extend what has been said, to question a statement by asking the group its opinion, or relate a statement to an experience others might have had which was contrary to that of the speaker's.

Her observations serve the additional purpose of evaluation of group and individual needs. Her observations of group and individual behavior guide her behavior and decisions. At what language level should she use the material? Must she use the material to promote emotional as well as cognitive development? When should she break into the child's personal experiences to move on with the learning activity? Can she move on tomorrow to the activity one step higher or should she continue today's activity?

Her words and deeds reveal a professionalism of teaching. Her methods and style are designed to facilitate learning and to serve the child's need for affective, social, and intellectual competencies rather than to serve the teacher's desire for control and discipline.

The teacher who shows happiness, joy, excitement, pleasure and who can permit a child to get physically and emotionally close to her is bound to establish a healthy child-teacher bond. The child who feels loved is the child who responds appropriately when the teacher shows sadness or annoyance over his behavior. A well-timed announcement that she is sad or mad (especially [illegible] it is eye-ball to eye-ball) can be a sobering experience to a child who has stretched the limits. Such a confrontation has neither a disruptive nor damaging effect on the child-teacher bond. The child who knows he is loved holds no grudge especially

THE TEACHER'S VERBAL AND NON-VERBAL BEHAVIOR SHAPE THE CHILD'S BEHAVIOR.

EVERY GAME HAS SOCIAL, PERSONAL-EMOTIONAL AND COGNITIVE OBJECTIVES.

SMALL GROUP EXPERIENCE PROVIDES A LEARNING ATMOSPHERE
NOT AVAILABLE IN THE LARGE CLASSROOM.

A SMALL GROUP THAT MAKES THE TEACHER PHYSICALLY AND MENTALLY AVAILABLE INVITES TRUST AND A SENSE OF SECURITY IN HER PRESENCE.

when the teacher is rarely mad or sad. If the teacher acts sad or mad rather frequently, announcements of her feelings have no arresting effect. She is a good salesman who has purpose and direction and believes in what she is doing. She gives of herself without asking for immediate results for her efforts. She has faith that each child can learn and is patient but persistent in her efforts to make it happen. By her words and deeds she shows a humane, personal side. She is natural and spontaneous and her behavior is appropriate and real.

F. Communication Pattern

The sixth variable of the Learning to Learn Program is the communication pattern.

A communication pattern is a combination of talking, behaving, and relating and is heavily influenced by the program's philosophy and attitudes toward children and learning. It is a two-way transaction from adult to child, child to adult, or child to child. What takes place between speaker and listener has a substantial impact on the child's self-image and the attitudes he will have toward learning, school and teachers.

The teacher's role and style and her use of the curriculum are frequently underestimated as a means of achieving this impact. By her behavior and attitudes and by ways she used material, the teacher encourages open, natural and spontaneous expression of ideas, feelings and personal observations. She shows respect and consideration by being physically and mentally close, perhaps through eye to eye contact. She listens to the child as though she really believed that what the child had to say was important. The teacher's reponse after the child stops talking confirms this respect and consideration when it contains something of the child's feelings and ideas. It is ego-building for a child to know that he has the teacher's attention and she showed that his ideas and views are important. This is the way to win the child's trust, encourage openness and active participation. What the teacher says or does after the child stops talking reveals to all the children if the teacher was really listening or just being polite by waiting until the child stopped talking so she could get on with what she had in mind.

In the small groups the activity is teacher-initiated and guided but it is not teacher-controlled and -dominated. She may introduce a piece of celery or toy truck and begin a discussion among the group members by inquiring about its name and the personal experiences the children have had with it. She listens and observes, finding an opportune time to clarify or extend the dialogue among the children or add a personal experience or observation. The goal of the activity may be to discover an object's properties or to fit it into a category with other vegetables or transportation. The teacher guides the conversation (with the aid of other concrete materials previously used)

ATTENTION, CONCENTRATION, DELAY, LISTENING, ARE BAS[illegible] INGREDIENTS FOR LEARNING.

toward this objective without ignoring or interrupting the children and controlling the conversation. The timing and content of her stimulation is all-important in bringing about maximum dialogue and setting up an opportunity for discovery by the children.

This opportunity for discovery and openness and spontaneity of communication reveals marked individual differences in development. The alert, curious, fast-developing children will bombard the teacher with why, how, where questions. If another child can answer, the teacher lets him do so before she answers. These quick children pause briefly to make personal references and they are always relevant to the activity. Then they want to get on with the challenge of the game or activity. The slow-developing children seldom ask these inquiring questions. They immediately go to personal experiences they have had with the object. It is not unusual for them to drift farther and farther from the object which stimulated them. This is where a skillful teacher guides the activity along the lines of the group's needs. For one group the social interaction (taking turns to talk, listening to another child) may be more important than the actual discussion of the cognitive objective for that activity or game. For a fast-developing group, the intellectual aspect of the game or activity may be the primary focus, with the social and emotional aspect important but less obvious. For a slow-developing group working with the same material, the game or activity may be used to satisfy personal emotional needs rather to explore completely the cognitive aspect of the activity. Each group is permitted to pace themselves. The teacher, by encouraging openness and spontaneity, and by being an alert listener and observer, can determine what that pace is for every group.

G. Parent-School Program

The parent is the vital link in the child's developmental educational process up to and during his enrollment in the Learning to Learn Program. Up to the time of his enrollment the parents had to draw upon their own personal experiences or search for outside resources in their efforts to meet the child's needs.

The primary mission of the Parent-School program is to point out to parents that they continue to be the vital link in this educational process. However, they now have the school to assist them in this stage of the process. The school shares with the parent a responsibility to further the child's education and development. The school is a partner in advancing this process, a partner with knowledge of children and learning and knowledge of their particular child from a different perspective.

THE PARENT EDUCATION PROGRAM IS AN INTEGRAL PART OF THE SCHOOL PROGRAM

To achieve this mission the Parent-School program has four objectives:

1. To establish communication between school and home through a parent-teacher relationship that fosters mutual respect and confidence.

2. To develop or strengthen positive attitudes toward learning and school.

3. To develop or strengthen close parent-child relationships.

4. To create or strengthen the home learning environment and "home curriculum."

5. To instill the school's values in the home.

The methods used to achieve these objectives are active parent participation and interaction. At the initial meeting parents are asked two questions:

1. In what way can we help your child this school year?
   What do you want your child to get out of school this year?

2. What help or information would you like to get from these meetings?

Instead of giving monthly lectures addressed to their hopes and expectations, we show the parents video-tapes of their children and the teacher in action. We have them focus on child behavior, teacher behavior, teacher-child relationships, child-child relationships and the curricular materials. We have two aims in mind. One is to let parents observe how child behavior shapes teacher behavior and attitudes; then how these enhance the learning process and the child's emotional, social and intellectual development. The second aim is to show that the teacher is guided by a sense of purpose and direction in her use of curriculum, organization and management of the classroom, and in her role as teacher.

The group discussion that follows relates a particular hope or expectation to the parents' observations. Linking the school's purpose to the parent's hopes and expectations provides direction to the Parent-School program. It was especially meaningful because everything is tied to the parents' and the children's needs. Parents can identify with the teacher role. By seeing concrete outcomes of the direction the teacher is taking, the parents develop a feeling of respect for the teacher and trust in her ability to provide emotional, social, and cognitive growth.

The parents are also shown the curricular materials the children are currently using and will be using the following month. The staff demonstrate their use, point out their objectives, and show how they build into each other. We relate these materials to what is available at home and how to use home in order to supplement the work of the school. But we emphasize how important is the total learning environment, especially the parent-child communication pattern. The final product is played down in favor of parent behavior and attitudes and the learning process. We let the parents know that we are interested in the work the children do at home and encourage them to have the child bring it to school to share with us. Such home activities help parents appreciate the child's work and the effort that goes into a task. Just as important, though, is the message the child receives: "What I do is important to my parents and to my teacher, therefore I must be important also." For example, at home together parent and child might go through a catalog or magazine to cut out and paste all the daddies and babies. At school, after the child tells the teacher and classmates what he did at home, the discussion moves from this concept to size, clothing, etc.

The teachers and director attend these meetings, but play a role similar to the teacher's role with the children. That is, they are alert listeners and observers who enter the discussion at an opportune time to clarify, inquire, and extend the parent-parent interaction. The parents talk about 80 percent of the time and the staff 20 percent. Most of the staff talking is done during the demonstration and explanation of the curricular materials.

Three individual conferences with parents replace the report card in first grade. This is in addition to the monthly meeting. In these conferences the child's progress since the previous individual conference is discussed. The parents' comments during these conferences are a good measure of the success of the Parent-School program the parents have been attending the previous two years. The school and home have worked together so closely that the parents, during these individual conferences, can tell the staff how much progress their child has made and in what areas. They can also tell the staff the areas of weaknesses. To an outsider, their accuracy would be surprising. It is apparent to the staff that the parents are involved in the education of their child and are following through on what they are learning in the monthly meetings.

CHAPTER IV

Methodology and Development of the Longitudinal Evaluation of the Learning to Learn Program

Aim of the Evaluation Study of the Learning to Learn Program

Basically, the findings after several years of preschool compensatory education are inconclusive (Stanford Research Institute, 1971). Recent developments in educational theory suggest that preschool programs can provide disadvantaged children with a set of experiences that will help diminish the effects of poverty and educational deficits. Supportive evidence has come from a few Head Start programs and laboratory preschools which produce relatively large improvements in learning ability. But the majority of Head Start and other compensatory preschool programs, although producing measurable immediate gains, have not produced lasting increases in children's intellectual and educational development.

The overall aim of this evaluation was 1) to investigate the effectiveness of the Learning to Learn Program on the intellectual, educational, and personal-social development of educationally high-risk black poverty children after termination of the program and; 2) to compare its effectiveness with that of traditional preschool educational programs.

This evaluation study explores the following issues: 1) the relative effects of the Learning to Learn Program on the educational competencies of children who attended the Learning to Learn Program as compared to those children who participated in traditional preschool and primary grade programs; 2) the developmental and longitudinal educational effects of different approaches to preschool intervention following termination of their early childhood education experiences. The study seeks to discover whether leveling off occurs in children's intellectual and educational abilities by the end of second grade, one year after termination of their early childhood educational experiences.

Experimental Design of the Learning to Learn Program

During the 1968-69 school year the Learning to Learn Demonstration Project was initiated (refer to Table 1). Four- and five-year-old black poverty children were selected for participation in the project.

Two groups of five-year-old black poverty children were individually matched on Stanford Binet IQ with one group being designated experimental (E_5P_2). They attended the Learning to Learn School kindergarten and their matched treatment control group (C_5P_2) attended public school Title I kindergarten classes in Duval County. Two groups of four-year-old black poverty children were group matched on Stanford Binet IQ. The experimental group (E_4P_3) attended nursery school at the Learning to Learn School and their matched treatment control group (C_4P_3) attended OEO sponsored daycare centers in Jacksonville.

During the 1969-70 school year the E_5P_2 group was in first grade at the Learning to Learn School, and their matched treatment control group (C_5P_2) was in first grade in the Duval County public schools. The other experimental group (E_4P_3) was in kindergarten at the Learning to Learn School and their matched treatment control group (C_4P_3) was in Title I kindergarten classes in Duval County public schools.

The 1970-71 school year marked the end of participation of the E_5P_2 group in the Learning to Learn Program. During this school year both the E_5P_2 and C_5P_2 groups attended second grade classes in the Duval County public schools. The E_4P_3 group attended first grade at the Learning to Learn School during the 1970-71 school year while their matched treatment control group (C_4P_3) participated in first grade classes in the Duval County public schools.

During the 1971-72 school year all groups were enrolled in public schools in Duval County, Florida, with the E_5P_2 and C_5P_2 groups enrolled in the third grade and E_4P_3 and C_4P_3 groups enrolled in the second grade. The data were collected for the evaluation study on all four groups in the spring of 1972.

TABLE 1

Design of the Evaluation Study of the Learning to Learn Program

Year	Groups			
		N	Grade	Age
1972-73***	E_5P_2**		4th	9
	C_5P_2**		4th	9
	E_4P_3**		3rd	8
	C_4P_3**		3rd	8
1971-72	E_5P_2**	15	3rd	8
	C_5P_2**	20	3rd	8
	E_4P_2**	23	2nd	7
	C_4P_3**	19	2nd	7
1970-71	E_5P_2**	16	2nd	7
	C_5P_2**	20	2nd	7
	E_4P_3*	20	1st	6
	C_4P_3**	18	1st	6
1969-70	E_5P_2*	17	1st	6
	C_5P_2**	20	1st	6
	E_4P_3*	22	Kind	5
	C_4P_3**	20	Kind	5
1968-69	E_5P_2*	21	Kind	5
	C_5P_2**	21	Kind	5
	E_4P_3*	23	Nurs	4
	C_4P_3	21	Nurs	4

NOTE:

1. E_5P_2 = Experimental Group of educationally high-risk black poverty children who participated, beginning at age five, for two years in the Learning to Learn Program. They attended second and third grades in Duval County, Florida, public schools.

2. E_4P_3 = Experimental Group of educationally high-risk black poverty children who participated, beginning at age four, for three years in the Learning to Learn Program. They attended public schools during second grade in Duval County, Florida.

TABLE 1 con't.

3. C_5P_2 = Matched Treatment Control Group for E_5P_2.

4. C_4P_3 = Matched Treatment Control Group for E_4P_3.

* In Learning to Learn Program
** In Duval County Public Schools
*** Evaluation to be conducted in Spring of 1973 funded by OCD, Dept. of HEW.

Sample Selections

During May and June of 1968 black poverty children were identified through the school system and through contact with churches in the poverty areas. Participants were also secured by public announcements inviting parents who were below the poverty level as established by the OEO guideline of 1968 to apply for enrollment of their children in the Learning to Learn Program. Finally, the assistance of the welfare department and pediatricians in the community was also utilized to identify eligible families.

The initial testing and screening of children for participation in the project was conducted during the summer of 1968 at the Learning to Learn School in Jacksonville, Florida. All children came from the same poverty neighborhood. Forty-four four-year-olds and forty-two five-year-olds were selected to participate in the project after the testing of approximately fifty four-year-olds and sixty five-year-olds.

The forty-four four-year-olds were divided into the experimental group (E_4P_3) and matched treatment control group (C_4P_3) by matching their performance on the Stanford Binet Intelligence Scale and the Seguin Form Board. This matching was on a group basis since we did not have enough children available to match them individually. A comparison of the preprogram scores of the two groups (E_4P_3 and C_4P_3) on these measures is presented in Table 2.

TABLE 2

Pre-Project Means, S.D.'s and t's for the Learning to Learn Experimental Group (E_4P_3) and their Matched Treatment Control Group (C_4P_3) on the Stanford Binet and Seguin Form Board

Measures	Grp.	N	$\overline{X}$ Age (mths)	$\overline{X}$ Score	SD	t
			Pre-Learning to Learn Project			
Stanford Binet	E_4P_3	23	51	87.7	11.9	
	C_4P_3	21	49	88.1	7.0	-0.16
Seguin (time score)	E_4P_3	23	51	75.8	28.2	
	C_4P_3	21	49	66.4	32.2	1.01

The forty-two five-year-olds were divided into the experimental group (E_5P_2) and the matched treatment control group (C_5P_2) by individually matching the children on the Stanford Binet. They were then also matched on a group basis in school readiness skills as measured by the School Readiness Screening Test, on two subtests from the Illinois Test of Psycholinguistic Abilities, and on their performance on the Seguin Form Board. These data are presented in Table 3.

TABLE 3

Pre-Project Means, S.D.'s and t's for the Learning to Learn Experimental Group (E_5P_2) and their Matched Treatment Control Group (C_5P_2) on the Stanford Binet, ITPA, SRST, and Seguin Form Board

Pre-Learning to Learn						
Measure	Grp.	N	CA (mths)	$\overline{X}$ Score	SD	t
Stanford Binet	E_5P_2	21	62	89.7	9.5	0.03
	C_5P_2	21	62	89.6	8.2	0.03
ITPA-Vocal Encoding	E_5P_2	21	62	9.3	2.8	
	C_5P_2	21	62	9.6	3.9	-0.22
ITPA-Auditory Vocal Assoc.	E_5P_2	21	62	8.2	2.5	
	C_5P_2	21	62	8.1	3.6	0.19
SRST	E_5P_2	21	62	10.6	3.6	
	C_5P_2	21	62	10.2	3.2	0.31
Seguin (time score)	E_5P_2	21	62	49.1	18.6	
	C_5P_2	21	62	44.7	18.4	0.75

The experimental groups and their matched treatment control groups did not significantly differ from each other on any of the measures.

For the purposes of the longitudinal analysis presented in Chapters V and VI both experimental groups, E_4P_3 and E_5P_2, were combined to form the E group and both control groups, C_4P_3 and C_5P_2, were combined to form the C group. In addition, the E and C children were divided into two subgroups each, one composed of children whose Pre-Project Stanford Binet IQ scores were 89 or below (below average intelligence) and the other composed of children whose initial Stanford Binet IQ scores were 90 or above (within or above the average range of intelligence).

The Pre-Project mean SBIQ scores for groups E and C are presented in Table 4. The E and C groups did not significantly differ on the Stanford Binet.

TABLE 4

Pre-Project Means, S.D.'s and t values for the Experimental Group (E) and their Matched Treatment Control Group (C) on the Stanford Binet

Measure	Grp.	N	$\bar{X}$ Score	SD	t
Stanford Binet	E	44	88.64	10.99	
	C	42	89.43	8.58	-0.37

Descriptive Evaluation of the Experimental and Control Children

All the children in the evaluation study were from low income black families. It was their first school experience and, for most, their first group social experience. In addition to language and communication difficulties, these children manifested social and interpersonal problems. They also had problems of motivation and of poor attitudes toward education, authority, and adults. Some were initially unable to take advantage of the opportunities of the classroom.

The parents' and, in some instances, grandparents' description of their children prior to the beginning of the project gave some insight into the temperaments of the children. The parents were asked how they would like the school to help their children during the school year. Some of their responses were as follows:

"Teach him to be not so mean."
"Teach him not to fight his brothers and sisters."
"Teach him to mind me."
"Teach him not to talk so much and so loud."
"Teach him not to just take things from somebody."
"Teach him his ABC's."

The parents of these children were on welfare or were employed in unskilled jobs. In approximately 40% of the homes, the fathers were absent and in a few cases the child was living with grandparents. The number of children per family ranged from three to nine.

The children in this study came from adult-centered homes. Our observations and interviews with the parents lead us to conclude that even when the parent was home there was very little adult-child interaction. In many cases the adult watched television late into the night in the same room where the children slept. Frequently, the oldest child had the responsibility of supervising the younger children during the day. But when the parents were home in the evenings and on weekends there was still very little adult supervision and interaction.

Objectives of the Evaluation Study

This study is an evaluation of the effects of the Learning to Learn Program on the social, cognitive, and educational development of black poverty children as compared with the effects of traditional preschool and first grade educational programs on these children. Specifically, it is oriented toward the determination of the lasting impact, if any, of preschool and first grade education upon the later school performance of black poverty children. This evaluation therefore, is concerned with one of the pressing educational and social issues of our time - that is, the determination and clarification of those characteristics and variables pertinent to successfully educating poverty children.

The investigators are attempting to furnish answers to the following questions: 1) Can the gains recorded by poverty children during preschool education carry over to their educational success in public school?; 2) What are the effects of preschool educational programs for children of different ability levels?; 3) Of what type and for what length of time should a preschool educational program be to insure adequate levels of social, cognitive, and educational development for poverty children?

Hypotheses: General

It is hypothesized that the experimental group of black poverty children who participated in the Learning to Learn Program will be developmentally and educationally superior to the matched treatment control group of black poverty children as measured by a wide variety of developmental measures. (Results presented in Chapter V).

It is further hypothesized that:

1. The Learning to Learn Program is an effective educational program for black poverty children who, prior to their participation in the program, were functioning below the average range of intelligence.

2. The experimental group of children who, prior to the Learning to Learn Program, were functioning below the average range of intelligence will be developmentally and educationally superior to their matched treatment control group at the end of second grade; one year after termination of the Learning to Learn Program. (Results presented in Chapter VI).

3. The Learning to Learn Program is an effective educational program for black poverty children who, prior to their participation in the program, were functioning within or above the average range of intelligence.

4. The experimental group of children who, prior to the Learning to Learn Program, were functioning within or above the average range of intelligence will be developmentally and educationally superior to their matched treatment control group at the end of second grade; one year after termination of the Learning to Learn Program. (Results presented in Chapter VI).

Hypotheses: Specific

The specific hypotheses for this evaluation are that:

1. At the end of third grade the E_5P_2 group will be developmentally and educationally superior to their matched treatment control group C_5P_2.

2. At the end of second grade the E_4P_3 group will be developmentally and educationally superior to their matched treatment control group C_4P_3.

3. The E_4P_3 experimental group will be developmentally and educationally superior to the E_5P_2 experimental group at the end of second grade.

4. There will be no developmental or educational difference between the control groups, C_4P_3 and C_5P_2, at the end of second grade.

The following developmental, intellectual, linguistic, personal-social, and educational characteristics were measured to assess the above hypotheses.

1. General intelligence
2. Ability to express ideas
3. Language comprehension
4. Verbal reasoning ability
5. Concept formation
6. Creativity and imagination
7. Achievement motivation
8. School achievement
9. Parental involvement and attitudes in the education of their child (groups E_4P_3 and C_4P_3 only).

Examiners and Testing Conditions

In the spring of 1972 a team of examiners from the University of Florida evaluated the children in the study. The examiners were white male and female psychometricians with experience in establishing rapport with and testing young black poverty children. They were clinical psychologists, doctoral students, or assistants in clinical psychology. The complete test battery required several 30-45 minute sessions for each child. If a child was ill he was rescheduled. Each examiner tested children from both experimental and control groups. Testing was conducted in familiar surroundings at the school that each child was attending.

The cognitive-related measures were administered individually to each child. (Stanford Binet, WISC Verbal Scales, Illinois Test of Psycholinguistic Abilities, Bender Gestalt, Spache Diagnostic Reading Scales, Verbal Language Measure, Rosenzweig Picture Frustration Test, Wepman Auditory Discrimination Test).

The measures of school achievement were administered to small groups of four - six children or to entire classes. (Written Language Measures, PMA II, SAT II, Math Performance Measure). Questionnaires were filled out by each child's teacher after the end of the school year (Florida Key, Achievement Motivation Questionnaire).

Measures

The diagnostic measures used were selected to assess general as well as specific developmental and educational characteristics and competencies of the children in the project. The following criteria were considered in the choice of diagnostic measures: age appropriateness, ease of administration, concurrent and predictive validity, reliability, and the availability of normative data. In certain instances we developed special measures to assess specific types of achievement behavior.

The measures that were used to ascertain the developmental and educational characteristics of the children who participated in this evaluation are as follows:

Developmental Characteristics	Measures
Intellectual functioning	
General intelligence	Stanford Binet Intelligence Scale, Form L-M
Abstract verbal ability	Wechsler Intelligence Scale for Children, Verbal Scales
School related intelligence	Primary Mental Abilities II

Developmental Characteristics	Measure
School achievement and abilities	School grades in academic subjects (reading, mathematics, language, writing)
	Stanford Achievement Test II
Reading ability	Spache Diagnostic Reading Scales
	School grades in reading
Arithmetic ability	Arithmetic subtest of the WISC
	School grades in mathematics
	Arithmetic subtests of the Stanford Achievement Test II
	Mathematics Performance Measure
Language ability	
Ability to express ideas	Illinois Test of Psycholinguistic Abilities, Vocal Encoding Subtest
Language comprehension	Illinois Test of Psycholinguistic Abilities, Auditory-Vocal Association Subtest
Verbal reasoning ability	Illinois Test of Psycholinguistic Abilities, Visual-Decoding Subtest
Concept formation	Illinois Test of Psycholinguistic Abilities, Visual-Motor Association Subtest
Spoken language ability	Ratings of children's verbal stories
Written language ability	Myklebust Picture Story Language Test
Ability to discriminate verbal messages	Wepman Auditory Discrimination Test
Personal-social characteristics	
Self concept	Florida Key
Achievement motivation	Teachers' ratings of children
Parental attitudes and involvement in the education of their children	Parental Questionnaires
Perceptual motor ability	Bender Gestalt Test

CHAPTER V

Overall Results

Introduction

The results presented in this chapter consist of the longitudinal findings which indicate the effects of the Learning to Learn Program and traditional early childhood educational experiences on the intellectual, educational, and personal-social growth of poverty children.

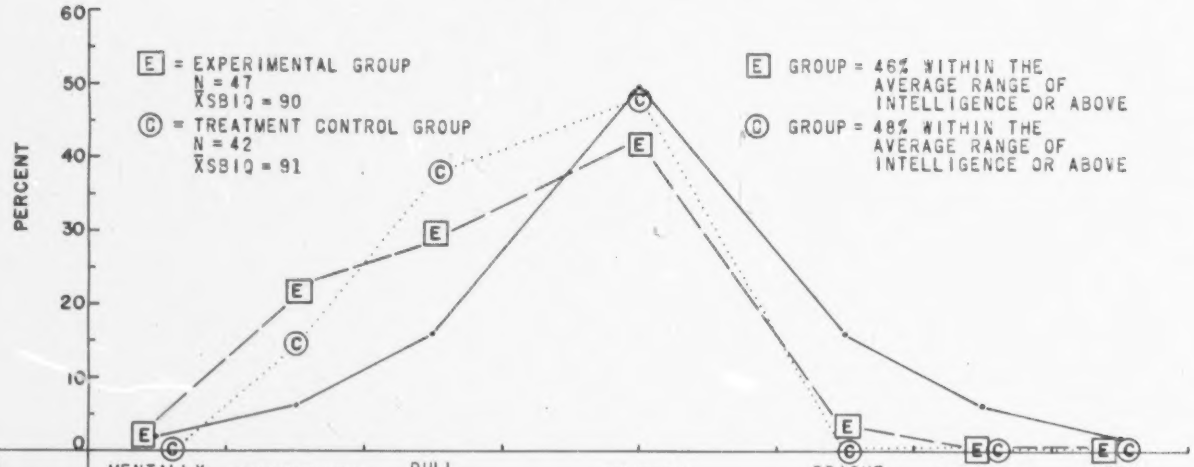
Intelligence

A pre-project Stanford Binet IQ distribution comparison between the children who participated in the experimental program (E) and their matched treatment controls (C) is presented in Figure 1. Prior to the beginning of the project 46 percent of the experimental children were within or above the average range of intelligence. Forty-eight percent of the children who were selected to be their matched treatment controls were within or above the average range of intelligence (average is defined as an IQ of 90 or above). It can be seen that both groups were well below the 1960 normative distribution of the Stanford Binet, in which 75 percent of the children were within or above the average range of intelligence. The pre-project mean IQ for the E group (which consists of children from the E_5P_2 and E_4P_3 groups) was 90, as compared to a mean of 91 for the C children (which consists of children from the C_5P_2 and C_4P_3 groups). There was no significant difference between the E and C groups on their pre Learning to Learn Program (PLTLP) Stanford Binet IQ scores. (Refer to Chapter IV, Table 4, p. 60).

A Stanford Binet IQ distribution comparison between the E and C groups at the end of second grade is presented in Figure 2. The analysis of this figure indicates that by the end of second grade (one year after termination of the Learning to Learn Program) there is a large and significant difference between the E and C groups on their intellectual performance. In the E group 85 percent of the children are within or above the average range of intelligence as compared to only 31 percent of the C children. The distribution of intelligence test scores for the E children is above that of the 1960 normative distribution of the Stanford Binet. However, the C group's IQ distribution is well below the standardization norms. Thirty-four percent of the experimental group is now functioning in the bright normal or superior ranges of intelligence as compared to only 3 percent of their treatment controls.

FIGURE 1

A PRE-LTLP STANFORD BINET IQ
DISTRIBUTION COMPARISON
BETWEEN THE EXPERIMENTAL CHILDREN (E)
AND THEIR MATCHED TREATMENT CONTROLS (C)



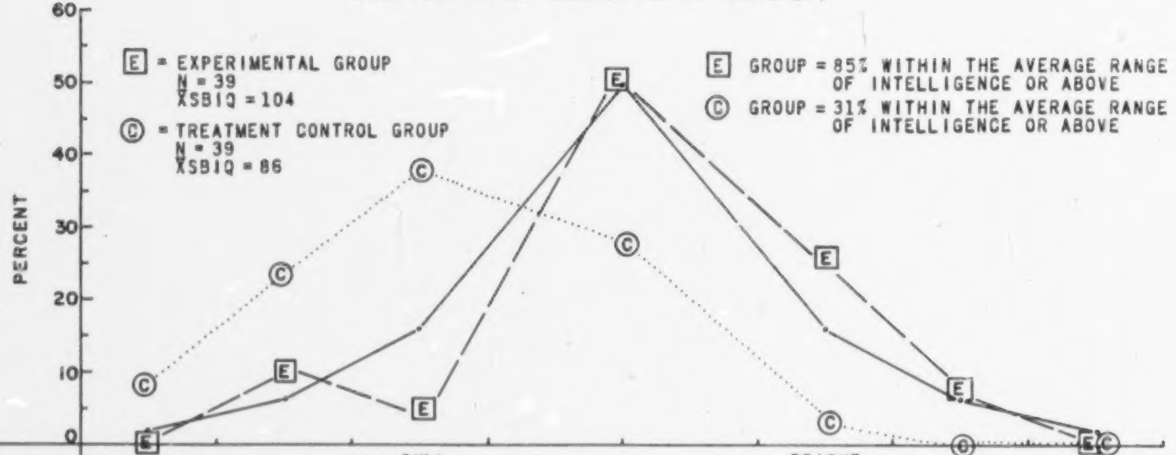
IQ CLASSIFICATION	MENTALLY DEFECTIVE	BORDERLINE	DULL NORMAL	AVERAGE	BRIGHT NORMAL	SUPERIOR	VERY SUPERIOR
IQ DISTRIBUTION RANGE	<69	70-79	80-89	90 - 109	110 - 119	120-129	>130
% WITHIN NORMAL DIST.	2.2%	6.7%	16.1%	50.0%	16.1%	6.7%	2.2%
% WITHIN E DISTRIBUTION	2%	22%	30%	42%	4%	0%	0%
% WITHIN C DISTRIBUTION	0%	14%	38%	48%	0%	0%	0%

NOTE: 1960 NORMATIVE DISTRIBUTION OF THE STANFORD BINET ——·——

FIGURE 2

A POST SECOND GRADE STANFORD BINET IQ DISTRIBUTION
COMPARISON BETWEEN THE E AND C CHILDREN

(ONE YEAR AFTER TERMINATION OF THE LTLP)



IQ CLASSIFICATION	MENTALLY DEFECTIVE	BORDERLINE	DULL NORMAL	AVERAGE	BRIGHT NORMAL	SUPERIOR	VERY SUPERIOR
IQ DISTRIBUTION RANGE	<69	70-79	80-89	90 - 109	110-119	120-129	>130
% WITHIN NORMAL DIST.	2.2%	6.7%	16.1%	50%	16.1%	6.7%	2.2%
% WITHIN E DISTRIBUTION	0%	10%	5%	51%	26%	8%	0%
% WITHIN C DISTRIBUTION	8%	23%	38%	28%	3%	0%	0%

NOTE: 1960 NORMATIVE DISTRIBUTION OF THE STANFORD BINET ——·——

Figure 3 represents a longitudinal comparison between the E and C groups on the Stanford Binet. As can be seen, prior to the initiation of the Learning to Learn Program there was no significant difference between the experimental and control groups. After the kindergarten year the E group exhibited a mean IQ gain of 14 points while the C children maintained their intellectual level of the previous year. By the end of first grade the E children were functioning with a mean IQ of 107 and the C children with a mean IQ of 89.

One year after termination of the Learning to Learn Program (post second grade) there existed an 18 IQ point difference between the children who participated in the Learning to Learn Program as compared to those children who had a traditional early childhood educational experience.

A post second grade IQ distribution comparison between the two groups on the Wechsler Intelligence Scale for Children - Verbal IQ (WISC-VIQ) is presented in Figure 4. It can be seen that the WISC-VIQ distribution for the experimental children is normally distributed and is slightly above the standardization norm with 89 percent of the children within or above the average range of intelligence. When comparing the matched treatment controls to the standardization norms, it is quite obvious that their distribution is well below that of the standardization norms. Only 36 percent of the control children were within or above the average range of intelligence at the end of the second grade.

A longitudinal comparison between the experimental and control groups on the Stanford Binet pre-project scores and the WISC-VIQ post second grade scores is presented in Figure 5. The analysis of this figure reveals that one year after the termination of the Learning to Learn Program the experimental children were 15 WISC-VIQ points higher than their controls.

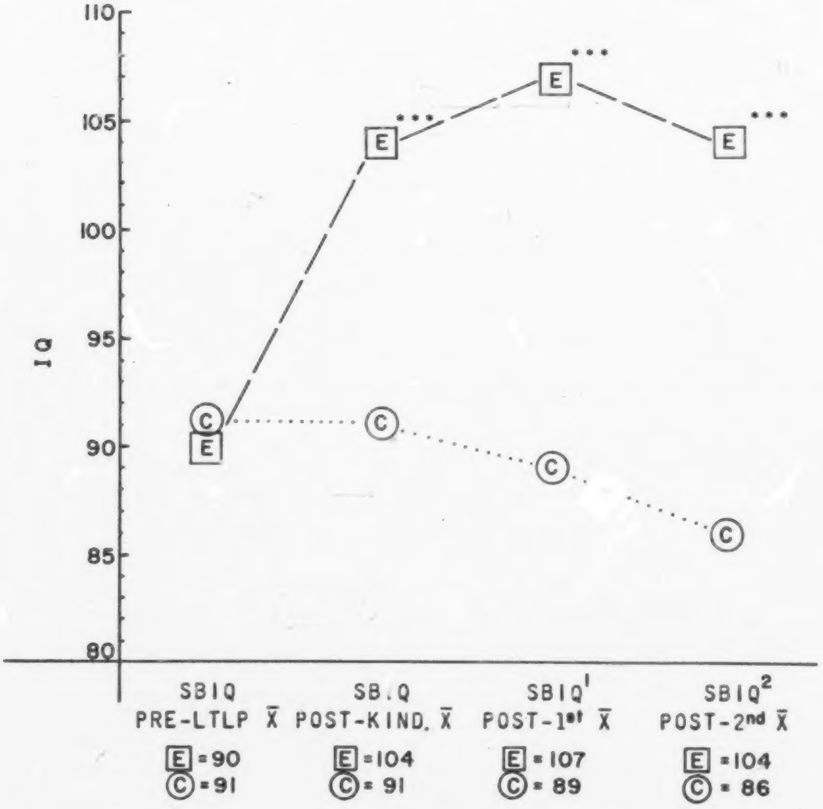
Figure 6 represents a deviation IQ (DIQ) distribution comparison between the E and C groups on the Primary Mental Abilities II at the end of second grade. This measure was incorporated into our evaluation to ascertain whether intellectual differences also existed in a school related measure of intelligence. The DIQ distribution of the E children approximates normality with 67 percent of them within or above the average range of intelligence. This, however, cannot be said for the C group where only 16 percent were within or above the average range of intelligence at the end of second grade.

Figure 7 represents a post second grade comparison between the experimentals and controls on the Primary Mental Abilities II deviation IQ. At the end of the second grade there existed a 20 DIQ point difference between the two groups on this measure of school related intelligence.

FIGURE 3

A LONGITUDINAL COMPARISON
BETWEEN $\boxed{E}$ AND Ⓒ GROUPS
ON THE STANFORD BINET

(PRE-LTLP TO POST SECOND GRADE)



NOTE:
*=NS
***=P<.001

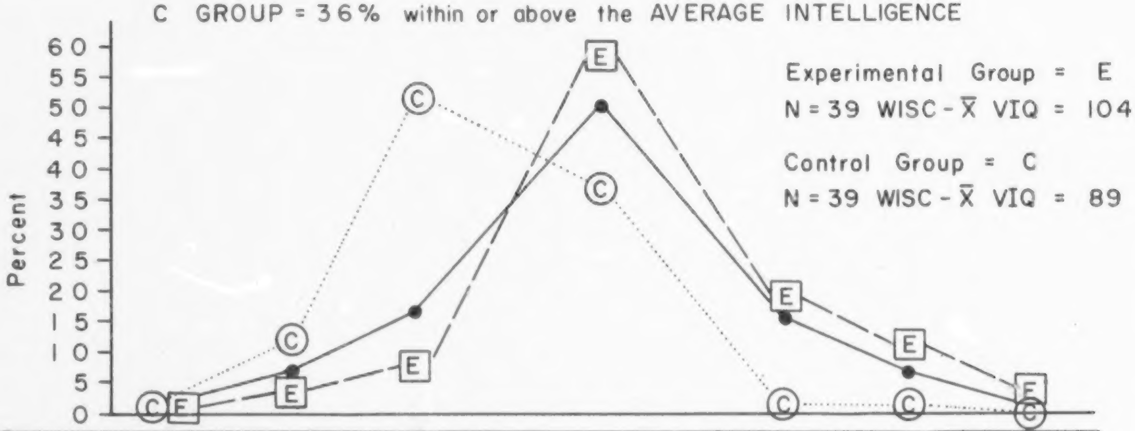
1 = TERMINATION OF LTLP
2 = ONE YEAR AFTER TERMINATION OF LTLP

FIGURE 4

A POST SECOND GRADE WISC VIQ Distribution COMPARISON BETWEEN THE E AND C GROUPS.

E GROUP = 89% within or above the AVERAGE INTELLIGENCE

C GROUP = 36% within or above the AVERAGE INTELLIGENCE



I.Q. CLASSIFICATION	Mentally Defective	Borderline	Dull Normal	Average	Bright Normal	Superior	Very Superior
I.Q. DISTRIBUTION RANGE	69	70–79	80–89	90–109	110–119	120–129	130
% WITHIN NORMAL DISTRIBUTION	2.2%	6.7%	16.1%	50.0%	16.1%	6.7%	2.2%
% WITHIN THE E DISTRIBUTION	0%	3%	8%	58%	18%	10%	3%
% WITHIN THE C DISTRIBUTION	0%	13%	51%	36%	0%	0%	0%

NOTE: 1949 NORMATIVE DISTRIBUTION OF THE WISC = —●—

FIGURE 5

A LONGITUDINAL POST SECOND GRADE COMPARISON BETWEEN THE E AND C GROUPS ON THE WISC VIQ

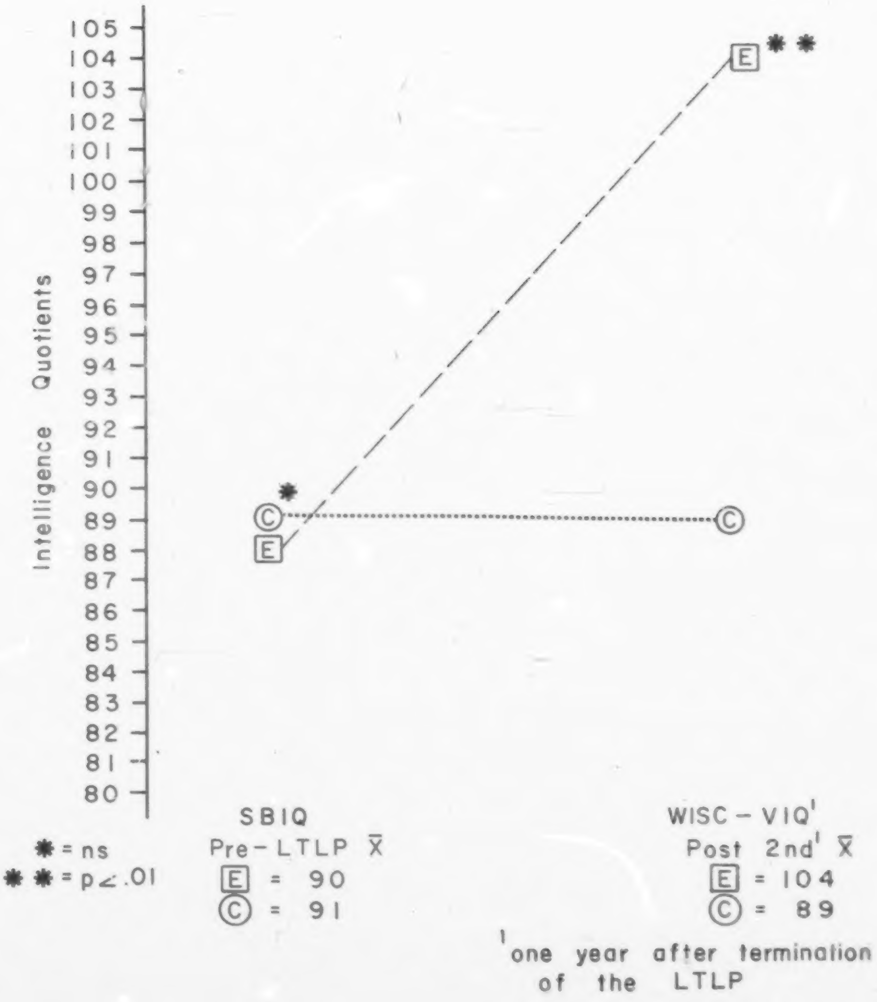
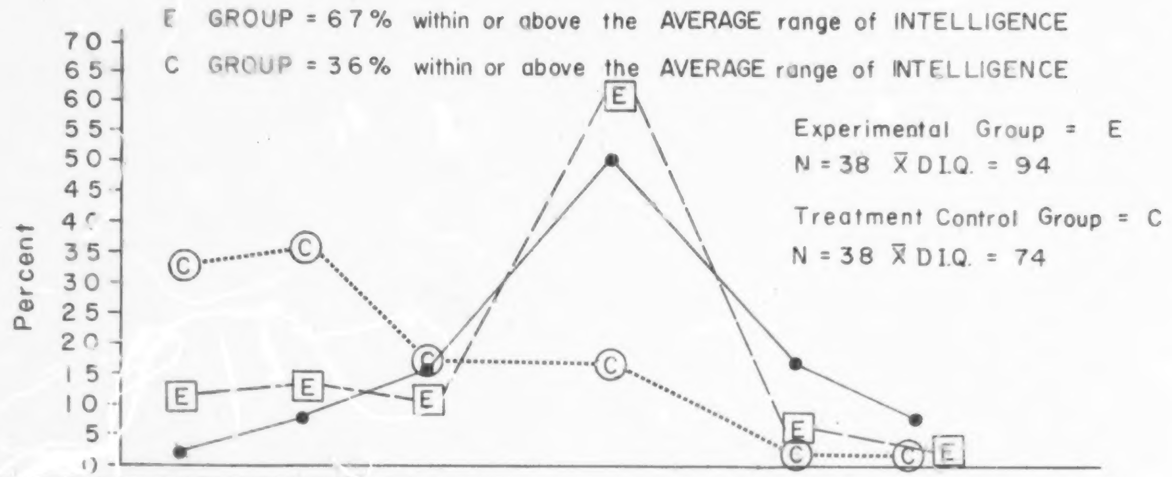


FIGURE 6

A POST SECOND GRADE PMA DEVIATION I.Q. DISTRIBUTION COMPARISON BETWEEN THE E AND C GROUPS.

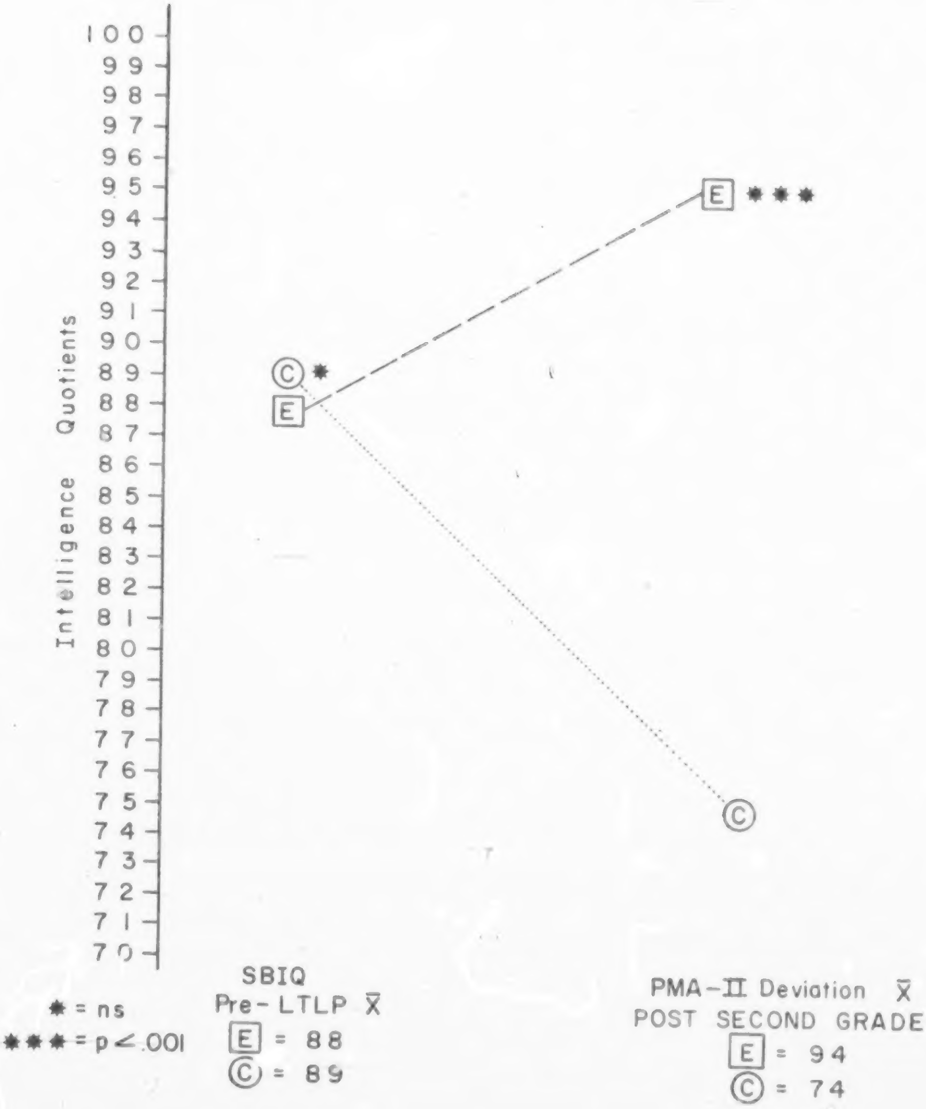


I.Q. CLASSIFICATION	Mentally Defective	Borderline	Dull Normal	Average	Bright Normal	Superior	Very Superior
I.Q. DISTRIBUTION RANGE	69	70-79	80-89	90-109	110-119	120-129	130
% WITHIN NORMAL DISTRIBUTION	2.2%	6.7%	16.1%	50.0%	16.1%	6.7%	2.2%
% WITHIN THE E DISTRIBUTION	10%	13%	10%	62%	5%	0%	0%
% WITHIN THE C DISTRIBUTION	32%	36%	16%	16%	0%	0%	0%

NOTE: NORMATIVE DISTRIBUTION = —●—

FIGURE 7

A POST SECOND GRADE COMPARISON BETWEEN THE E AND C GROUPS ON THE PRIMARY MENTAL ABILITIES II.



Summary

The experimental Learning to Learn children's intellectual performance is slightly above the normal distribution on both the individually and group administered intelligence tests (Stanford Binet, WISC-VIQ, PMA-II). At the end of second grade 85, 89, and 69 percent of these children respectively were functioning within or above the average range on these tests. When making the same comparisons for their matched treatment controls who participated in traditional preschool programs, a striking difference is evident. At the end of second grade their intellectual performance was below the standardization samples on these measures. For the C children approximately 60, 70, and 84 percent respectively were functioning below average as compared to about 15 percent for the E children.

School Achievement

Figure 8 represents comparison between the E and C groups on school achievement at the end of second grade. (Academic subject grades in reading, arithmetic, language, and writing). Ninety-seven percent of the academic grades received by the experimental children were in the A, B, and C range, as compared to 62 percent for their controls. Only 3 percent of the grades received by the experimental children were in the D or E range, as compared to 38 percent for their matched treatment controls. The mean grade point average across all academic subjects was 2.6 (B) for the E children as compared to 1.7 (C) for the C children.

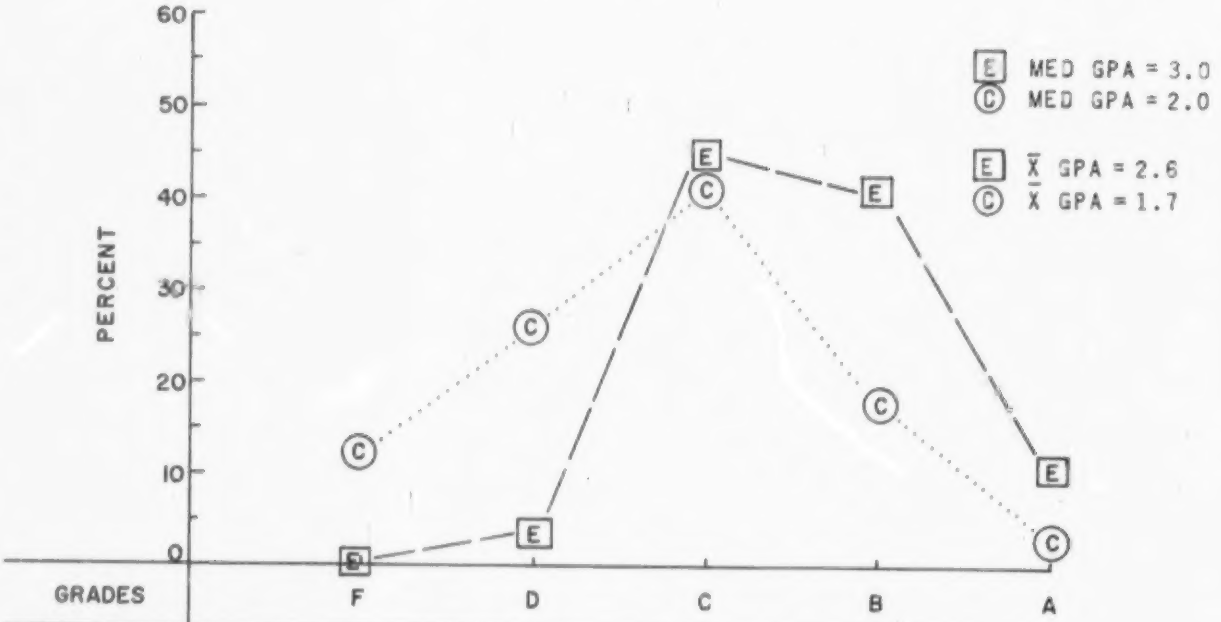
When comparing the experimental and control children on a group measure of school achievement (Stanford Achievement Test II), it is quite apparent that there is a large difference in academic performance between the two groups (Figure 9). Twenty-seven percent of the experimental children are at or above grade level as compared to only 6 percent of their matched treatment controls. Fifty-six percent of the E children were within six months of grade level whereas this is true for only 25 percent of the controls. Thirty-eight percent of the controls were over a year and a half below grade level on the group measures of school achievement while only 12 percent of the experimental children were this far behind.

Reading Ability

A post second grade distribution comparison between the experimental and control children on the Spache Diagnostic Reading Skills Test is presented in Figure 10. The analysis of Figure 10 reveals that 75 percent of the experimental children are reading at or above grade level (2.8) at the end of second grade, while only 26 percent of their matched treatment controls are at or above grade level. Only 3 percent of the

FIGURE 8

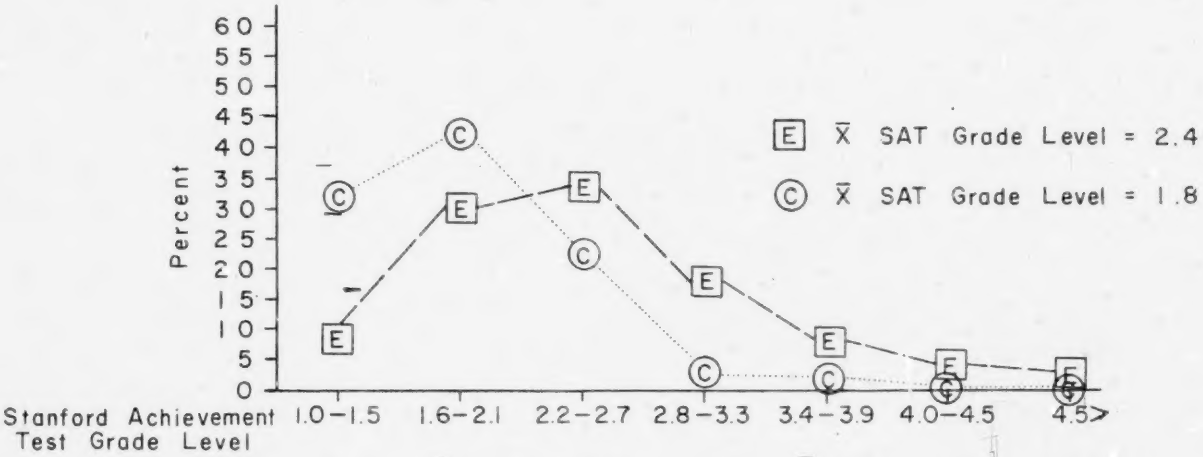
A POST SECOND GRADE COMPARISON
BETWEEN THE E AND C GROUPS
ON ACADEMIC GRADES



GRADES	F	D	C	B	A
E % GRADE DIST.	0%	3%	45%	41%	11%
C % GRADE DIST.	12%	26%	41%	18%	3%

FIGURE 9

A POST SECOND GRADE COMPARISON BETWEEN THE E AND C GROUPS ON THE STANFORD ACHIEVEMENT TEST II.

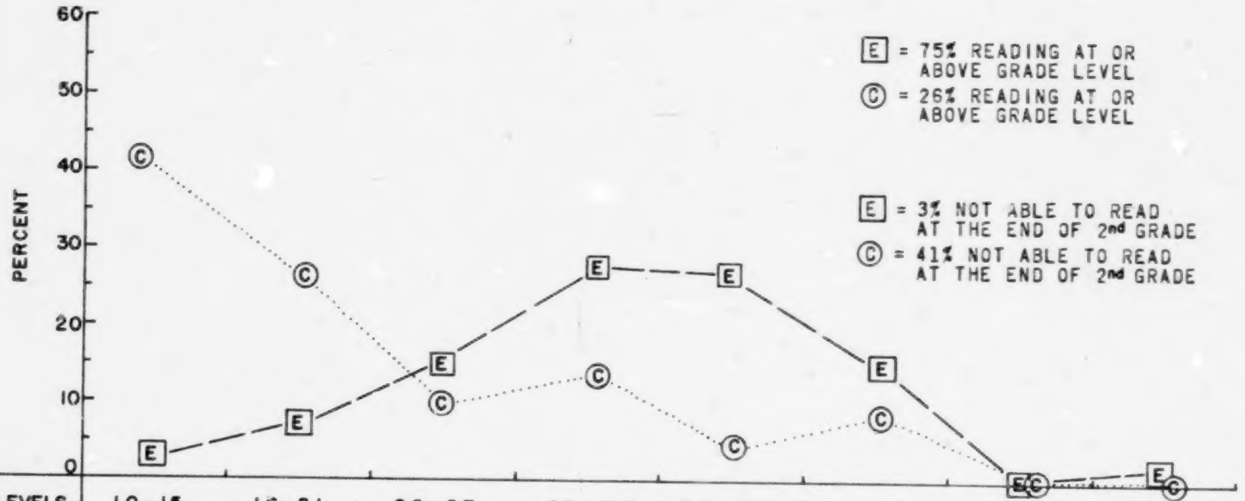


E	9%	30%	34%	17%	7%	3%	0%
C	32%	41%	21%	4%	1%	1%	0%

2.8 = Grade Level at time of testing.
I = one year after termination of the LTLP.

FIGURE 10

A POST SECOND GRADE
READING DISTRIBUTION COMPARISON
BETWEEN THE E AND © GROUPS



GRADE LEVELS	1.0 - 1.5	1.6 - 2.1	2.2 - 2.7	2.8 - 3.3	3.4 - 3.9	4.0 - 4.5	4.6 - 5.1	5.2 - 5.7
E % WITHIN GRADE LEVEL	3%	7%	15%	28%	27%	15%	0%	5%
© % WITHIN GRADE LEVEL	41%	26%	10%	13%	5%	8%	0%	0%

experimental children were not able to read at the end of second grade, as compared to 41 percent of the control children. The word recognition skills and instructional reading level of the E children were both at the 3.3 grade level, while their potential reading level was 3.8. (Refer to Figure 11). The control children were reading at the 1.8 and 1.6 grade levels in word recognition skills and instructional reading level, and their potential reading level was 2.8. The control children were approximately one and one half years below the experimental children in reading ability at the end of second grade.

Figure 12 represents a post second grade distribution of classroom reading grades. As can be seen, 97 percent of the children who participated in the Learning to Learn Program received grades of A, B, or C in reading, as compared to only 52 percent for the control children. It is of importance to point out that 48 percent of the control children received reading grades of D or E as compared to 3 percent of the experimental children. There was more than one letter grade difference between the two groups at the end of second grade.

Arithmetic

Figure 13 represents a post second grade comparison between the E and C groups on the Arithmetic subtest of the WISC. Seventy-four percent of the E children were above the mean on this measure as compared to 35 percent of the C children. The E children's Arithmetic test age equivalent was 12.2 as compared to 9.2 for their controls. Only 8 percent of the E children were functioning below their chronological age level in arithmetic ability at the end of second grade as compared to 37 percent of the controls. Based on the WISC equivalent test ages (Wechsler, 1949), 43 percent of the E children were functioning above the 14 year Arithmetic test age level as compared to 10 percent of the C children.

Figure 14 represents a post second grade comparison between the E and C children on arithmetic school performance (arithmetic school grades). Ninety-five percent of the children who participated in the Learning to Learn Program received letter grades of A, B, or C in arithmetic as compared to 66 percent of the control children. Thirty-four percent of the C children received arithmetic grades of D and E as compared to only 5 percent for the E children. At the end of second grade the E children's arithmetic performance was a letter grade higher than their controls.

A post second grade comparison between the E and C children on a group measure of arithmetic achievement (Arithmetic subtests of the Stanford Achievement Test) is presented in Figure 15. Sixty-three percent of the E children are functioning within six months of grade

FIGURE 11

A POST SECOND GRADE COMPARISON BETWEEN THE EXPERIMENTAL (E) AND CONTROL (Ⓒ) GROUPS ON READING ABILITIES

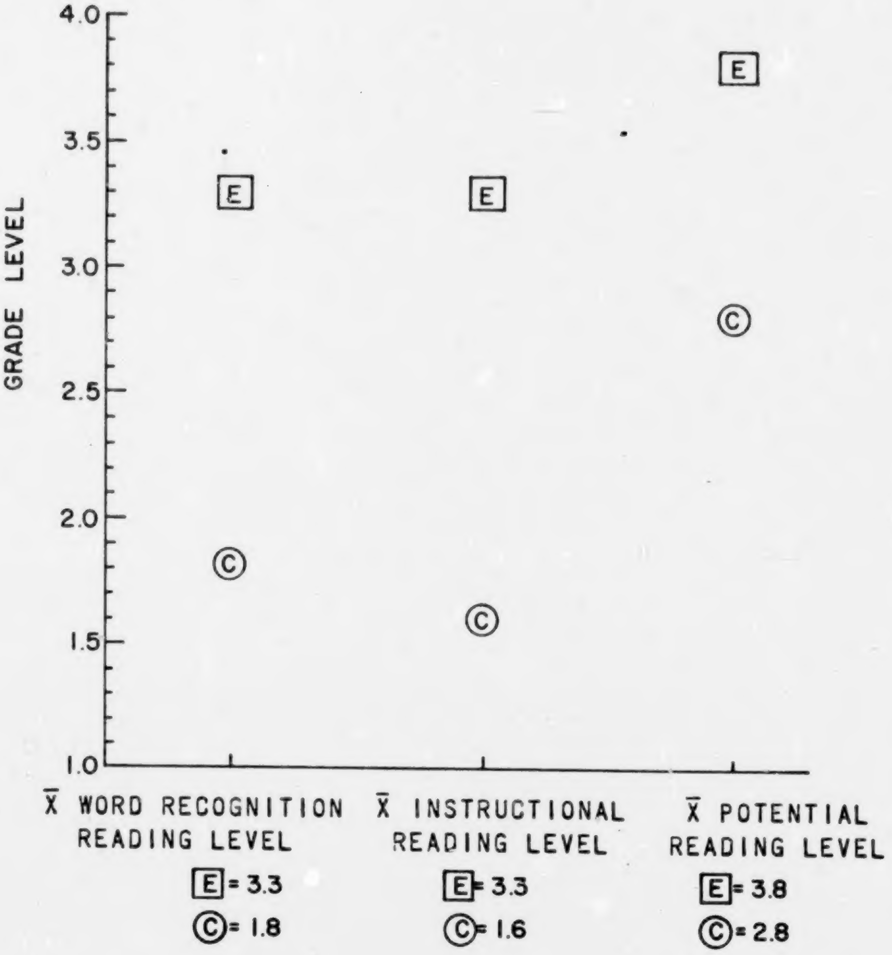
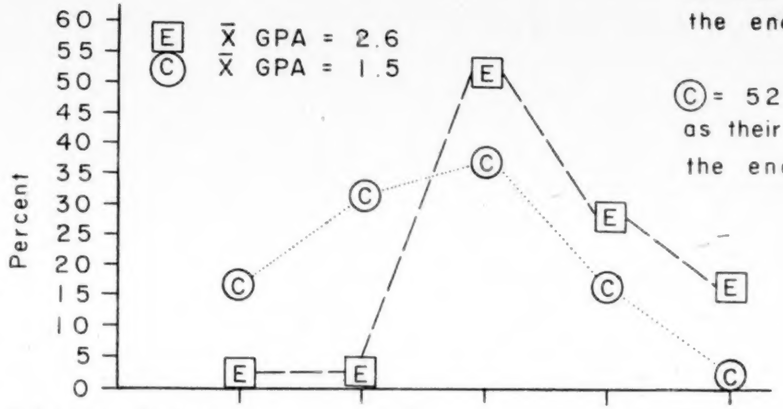


FIGURE 12

A POST SECOND GRADE READING GRADE DISTRIBUTION COMPARISON BETWEEN THE E AND C GROUPS.



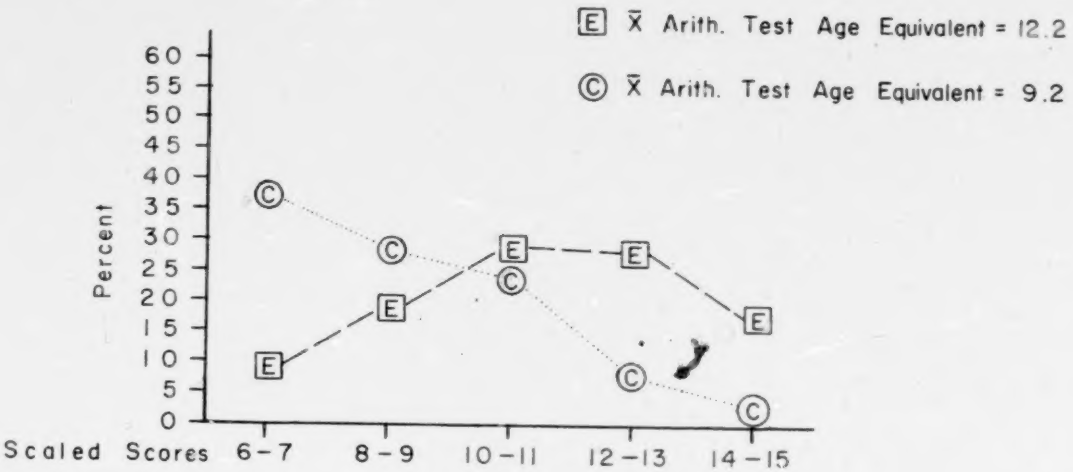
E = 97 % received A,B,C as their reading grade at the end of 2nd Grade.

C = 52% received A,B,C as their reading grade at the end of 2nd Grade.

Reading Letter Grade	F	D	C	B	A
% Within E Distribution	0 %	3 %	51 %	28 %	18 %
% Within C Distribution	16%	32%	36%	16 %	0 %

FIGURE 13

A POST SECOND GRADE COMPARISON BETWEEN THE E AND C GROUPS ON THE ARITHMETIC SUBTEST OF THE WISC.

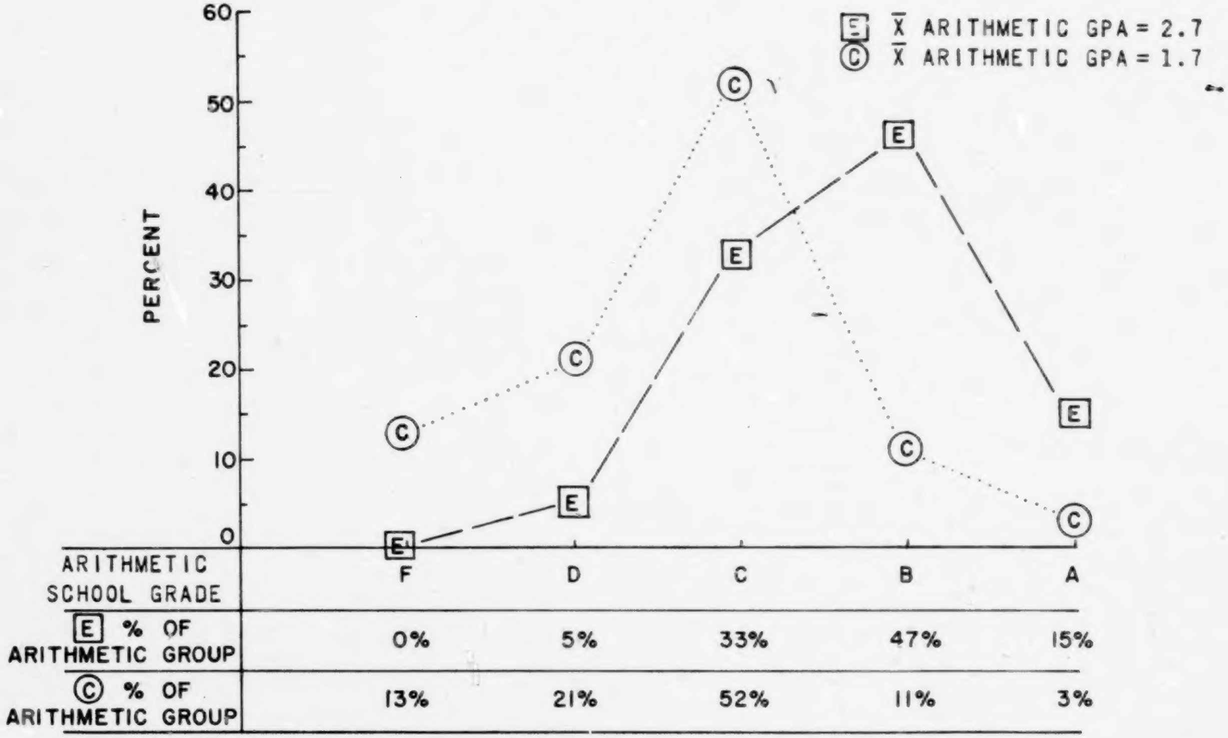


Scaled Scores	6-7	8-9	10-11	12-13	14-15
% Within E Distribution	8 %	18 %	29 %	29 %	16 %
% Within C Distribution	37%	29 %	24 %	8 %	3 %

Note: a scaled score of 10 represents the mean test performance for the particular age of the children being tested.

FIGURE 14

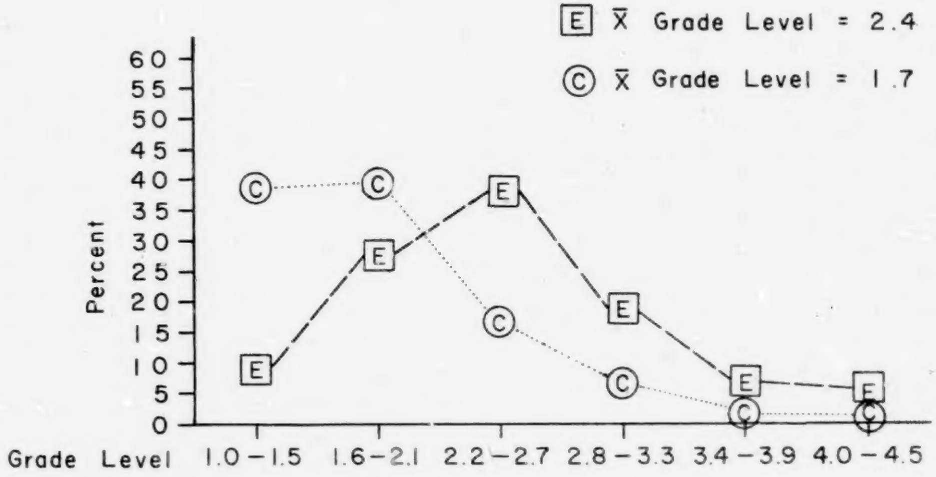
A POST SECOND GRADE COMPARISON BETWEEN THE E AND C GROUPS ON ARITHMETIC GRADES



ARITHMETIC SCHOOL GRADE	F	D	C	B	A
E % OF ARITHMETIC GROUP	0%	5%	33%	47%	15%
C % OF ARITHMETIC GROUP	13%	21%	52%	11%	3%

FIGURE 15

A POST SECOND GRADE COMPARISON BETWEEN THE E AND C CHILDREN ON THE ARITHMETIC SUBTEST OF THE STANFORD ACHIEVEMENT TEST.



Grade Level	1.0 – 1.5	1.6 – 2.1	2.2 – 2.7	2.8 – 3.3	3.4 – 3.9	4.0 – 4.5
% Within E Distribution	9%	28%	37%	19%	6%	1%
% Within C Distribution	38%	39%	16%	6%	1%	0%

level and only 23 percent of the controls are within this same range. Thirty-eight percent of the C children are functioning approximately from one to one and one-half years below grade level as compared to only 9 percent for the E group.

Language

A post second grade language age comparison between the E and C groups on four subtests of the ITPA is presented in Figure 16. Forty-eight percent of the E children were functioning with language age scores at or above their chronological age as compared to 13 percent of the C children. Seventeen percent of the E children's language age scores are one and one-half years below their chronological age, as compared to 38 percent of the matched treatment controls. The mean language age difference between the two groups is approximately one year.

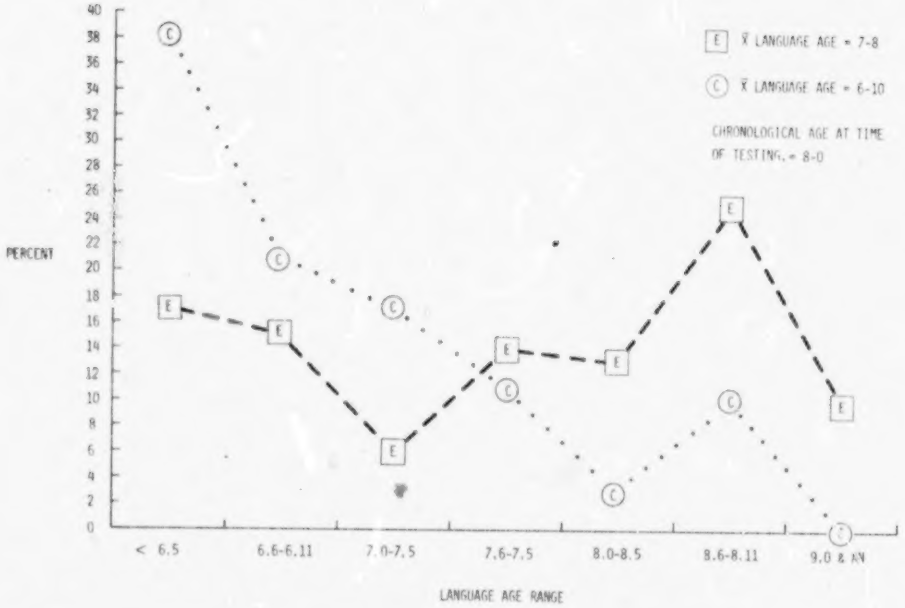
Figure 17 represents comparisons between the E and C children on verbal language performance (mean words per sentence derived from their verbal stories). Nineteen percent of the C children have sentences with a mean length of less than five words, whereas 74 percent of the E children have sentences with a mean length of greater than nine words. Thirty-two percent of the controls are in this range. The E children average three more words per sentence and three more sentences per story than the controls.

Figures 18, 19, and 20 represent the comparison between the E and C groups on measures of written language performance (Myklebust Picture Story Language Test). Inspection of these comparisons (mean words per sentence, mean number of sentences, and syntax quotient), indicates that the E children are quite superior to their controls. Eighty-four percent of the E children use six or more words in their written sentences, as compared to 30 percent for the controls. Twenty-three percent of the C children have sentences with just one or two words (Figure 18). Eighty-nine percent of the E children use three or more sentences in their written stories as compared to 41 percent of the controls. Fifty-nine percent of the C children used less than two sentences in their written stories. One hundred percent of the E children's syntax quotients were above the 70th percentile range as compared to 50 percent for their controls. Thirty-three percent of the C group had syntax quotients below the 9th percentile, which is indicative of children who have no facility to use language in written form.

A post second grade auditory discrimination (Wepman) comparison between the E and C groups is presented in Figure 21. Ninety-four percent of the E children's scores were within the normal range as compared to 70 percent for the controls. Twenty-seven percent of the C group scored low enough on the Wepman to indicate that their decoding of verbal messages is seriously impaired.

FIGURE 16

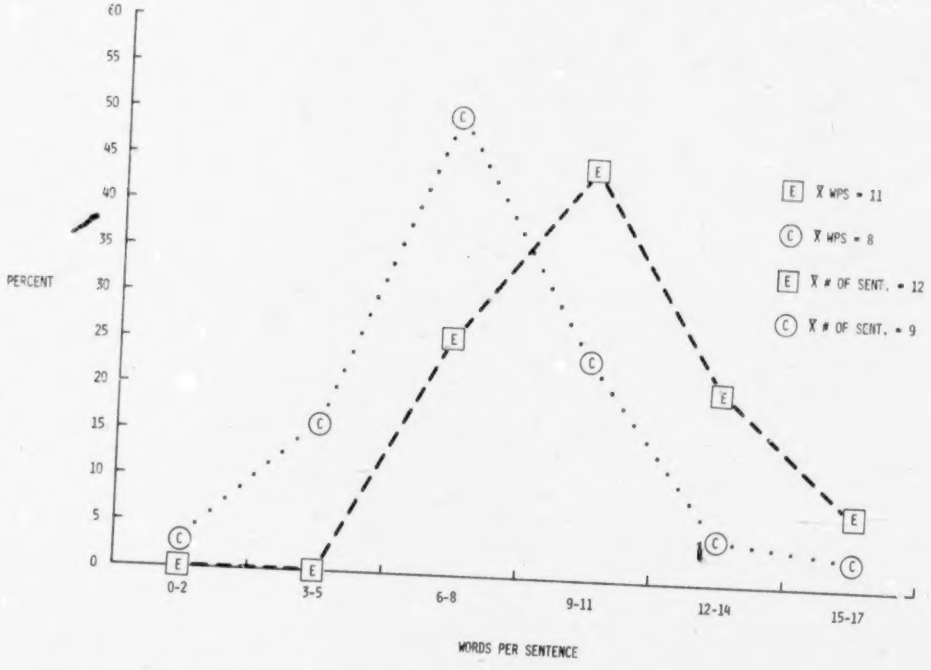
A POST SECOND GRADE LANGUAGE AGE COMPARISON BETWEEN THE E AND C GROUPS ON FOUR SUBTESTS OF THE ITPA. (AVA, VE, VD AND VMA)



% WITHIN E DISTRIBUTION	17%	15%	6%	14%	13%	25%	10%
% WITHIN C DISTRIBUTION	38%	21%	17%	11%	3%	10%	0%

FIGURE 17

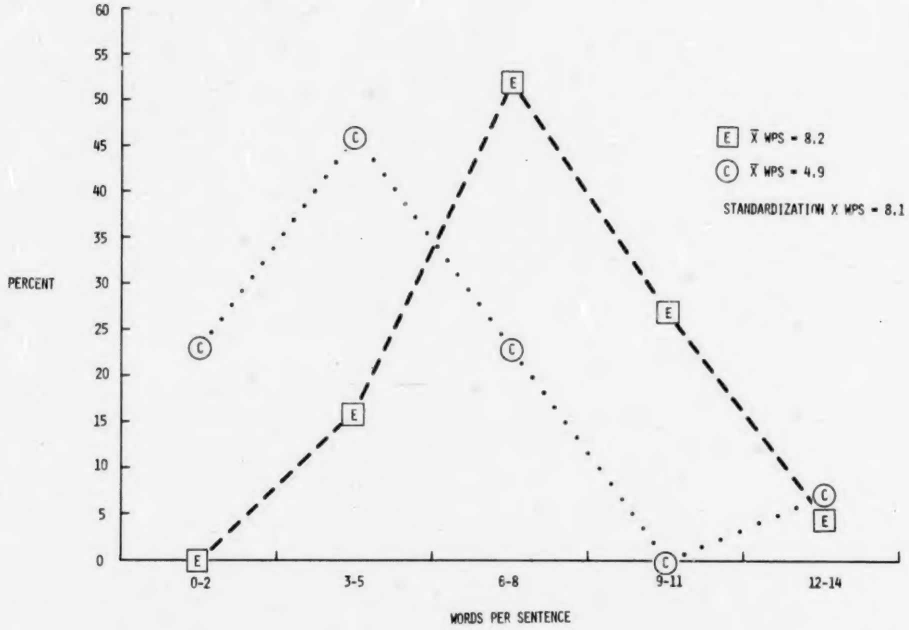
A POST SECOND GRADE VERBAL WORDS PER SENTENCE DISTRIBUTION COMPARISON BETWEEN THE E AND C GROUPS.



% WITHIN E DISTRIBUTION	0%	0%	26%	45%	21%	8%
% WITHIN C DISTRIBUTION	3%	16%	50%	24%	5%	3%

FIGURE 18

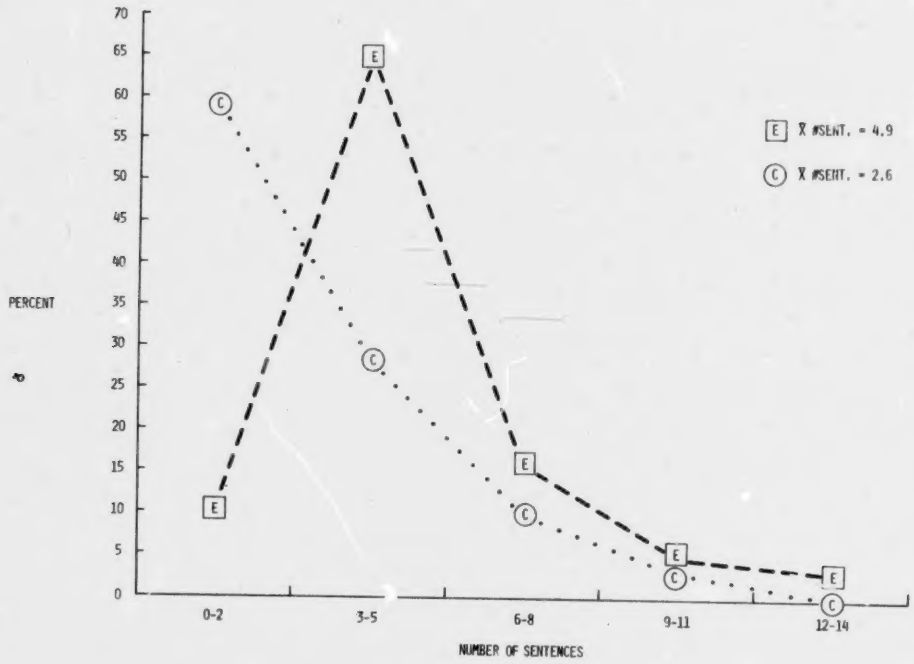
A POST SECOND GRADE WRITTEN WORDS PER SENTENCE DISTRIBUTION
COMPARISON BETWEEN THE E AND C GROUPS.



	0-2	3-5	6-8	9-11	12-14
% WITHIN E DISTRIBUTION	0%	16%	52%	27%	5%
% WITHIN C DISTRIBUTION	23%	46%	23%	0%	7%

FIGURE 19

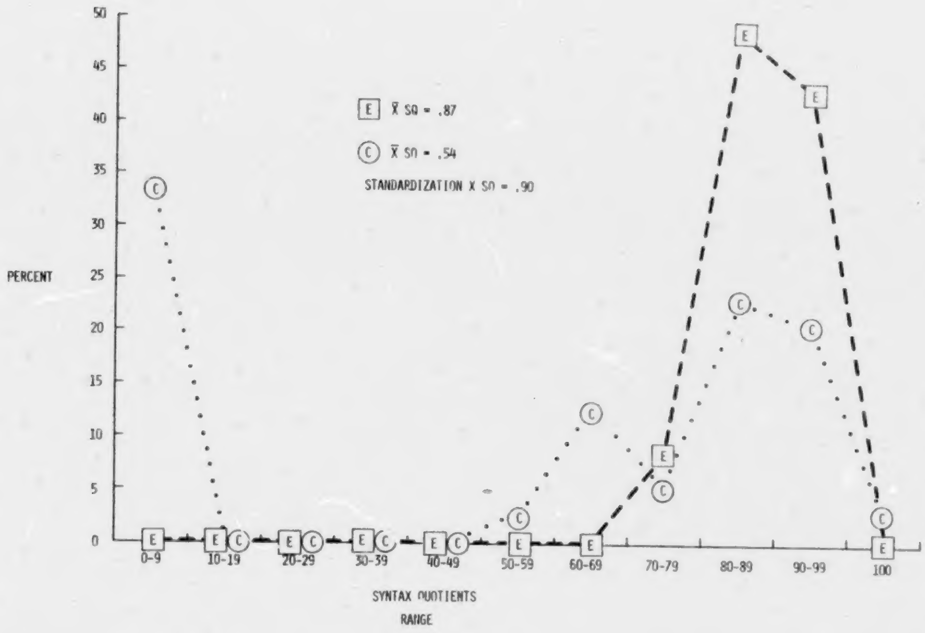
A POST SECOND GRADE WRITTEN NUMBER OF SENTENCES DISTRIBUTION COMPARISON BETWEEN THE E AND C GROUPS.



% WITHIN E DISTRIBUTION	11%	65%	16%	5%	3%
% WITHIN C DISTRIBUTION	59%	28%	10%	3%	0%

FIGURE 20

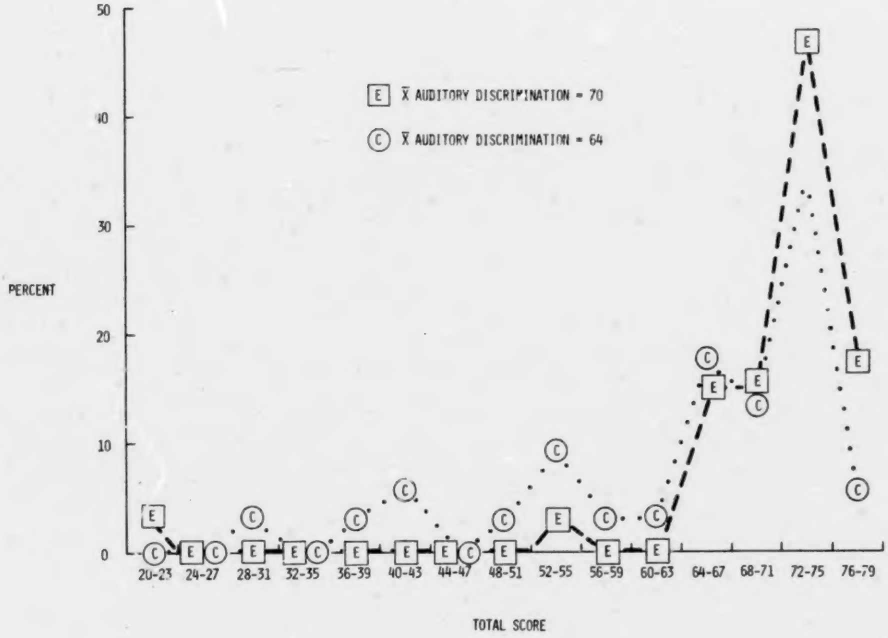
A POST SECOND GRADE SYNTAX QUOTIENT DISTRIBUTION
COMPARISON BETWEEN THE E AND C GROUPS.



% WITHIN E DISTRIBUTION	0%	0%	0%	0%	0%	0%	0%	8.10%	48.64%	43.24%	0%
% WITHIN C DISTRIBUTION	33.33%	0%	0%	0%	0%	2.56%	12.82%	5.12%	23.07%	20.51%	2.56%

FIGURE 21

A POST SECOND GRADE AUDITORY DISCRIMINATIONS DISTRIBUTION COMPARISON BETWEEN THE E AND C GROUPS.



% WITHIN E DISTRIBUTION	3%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	15%	15%	47%	18%
% WITHIN C DISTRIBUTION	0%	0%	3%	0%	3%	6%	0%	3%	9%	3%	3%	17%	14%	34%	6%

Personal-Social

A post second grade distribution comparison between the E and C groups on self concept (Florida Key) is presented in Figure 22. Eighty-four percent of the E children were rated by their teachers on self concept as functioning at an appropriate level as compared to 57 percent of the controls. Of importance is that 13 percent of the C children were rated by their teachers as having self concepts that were detrimental to their academic performance. None of the E children were rated in this category. There is approximately a 10 point mean difference between the E and C groups on self concept.

A post second grade comparison between the E and C children on achievement motivation is presented in Figure 23. Ninety-two percent of the E children were rated by their teachers as having achievement motivation that was indicative of personal attributes that are related to academic success in school. Sixty-two percent of their controls were rated at the same level. Upon a close analysis of Figure 23, one becomes aware that 38 percent of the control children's achievement motivation is well below the criterion that is necessary for academic success in our public schools.

Perceptual Motor Skills

A longitudinal comparison between the E and C groups in perceptual motor skills (Bender Gestalt) is presented in Figure 24. The E children's perceptual motor skills are superior to their controls after kindergarten, first, and second grades, and are equal to the standardization mean for their age level at the end of first and second grades.

A post second grade comparison between the two groups on the Bender Gestalt is presented in Figure 25. Ninety-two percent of the experimental children scored within or better than their age level as compared to only 60 percent for their controls. The E children's mean error score was approximately the same as the standardization mean for perceptual motor ability.

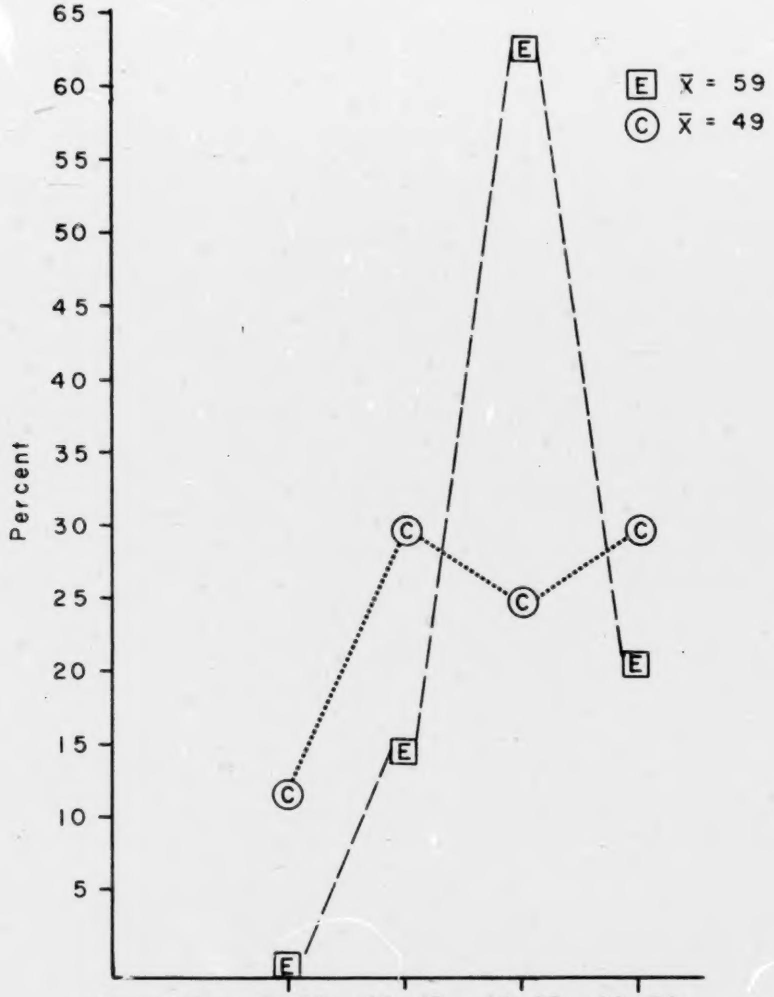
Summary

The results presented in this chapter indicate that the children who participated in the Learning to Learn Program made significantly greater intellectual, developmental, and educational gains one year after termination of the program than their matched treatment controls.

The children in the experimental group have mastered the rudiments and skills necessary for reading at grade level as demonstrated by their performance on both individual and group reading measures and by the reading grades assigned to them by their teachers at the end of second

FIGURE 22

A POST SECOND GRADE DISTRIBUTION COMPARISON BETWEEN THE E AND C GROUPS ON SELF CONCEPT.



RAW SCORE	0-22	23-45	46-68	69-90
% Within E Distribution	0%	16%	63%	21%
% Within C Distribution	13%	31%	26%	31%

FIGURE 23

A POST SECOND GRADE DISTRIBUTION COMPARISON BETWEEN THE E AND C GROUPS ON ACHIEVEMENT MOTIVATION.

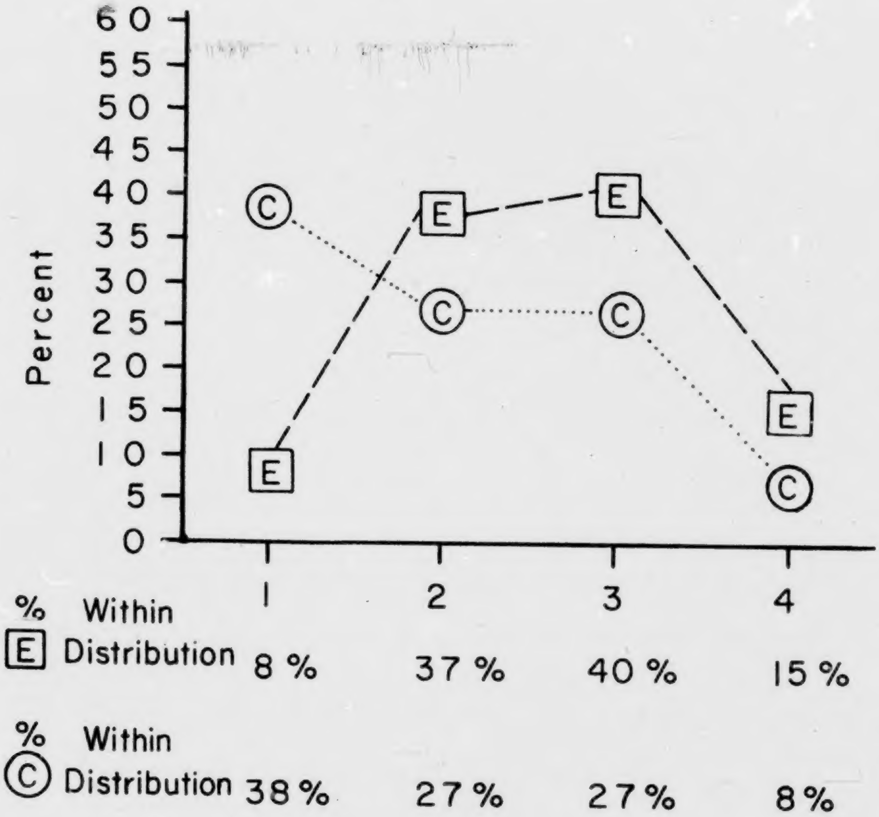
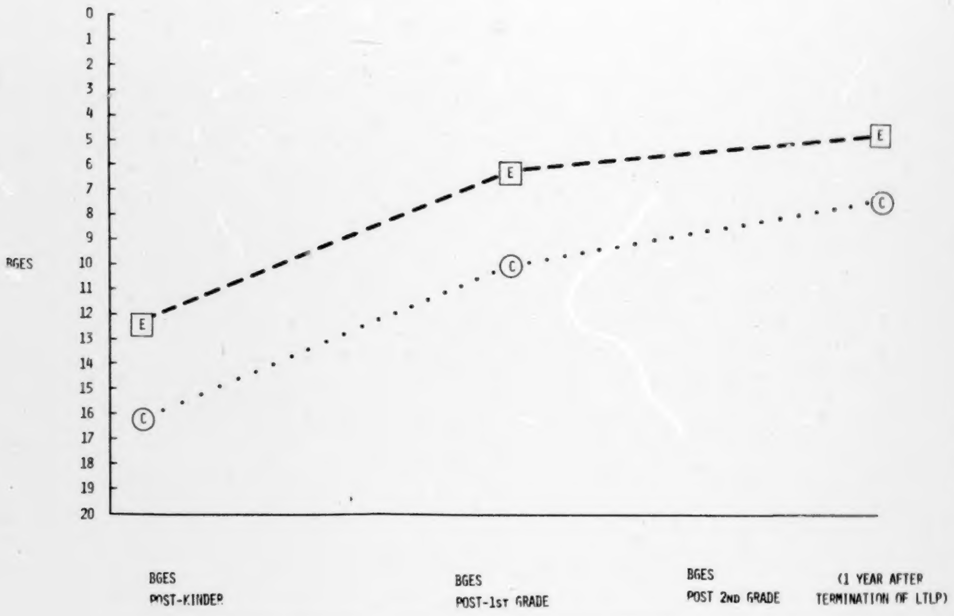


FIGURE 24

A LONGITUDINAL COMPARISON BETWEEN THE E
AND C GROUPS ON THE BENDER GESTALT.

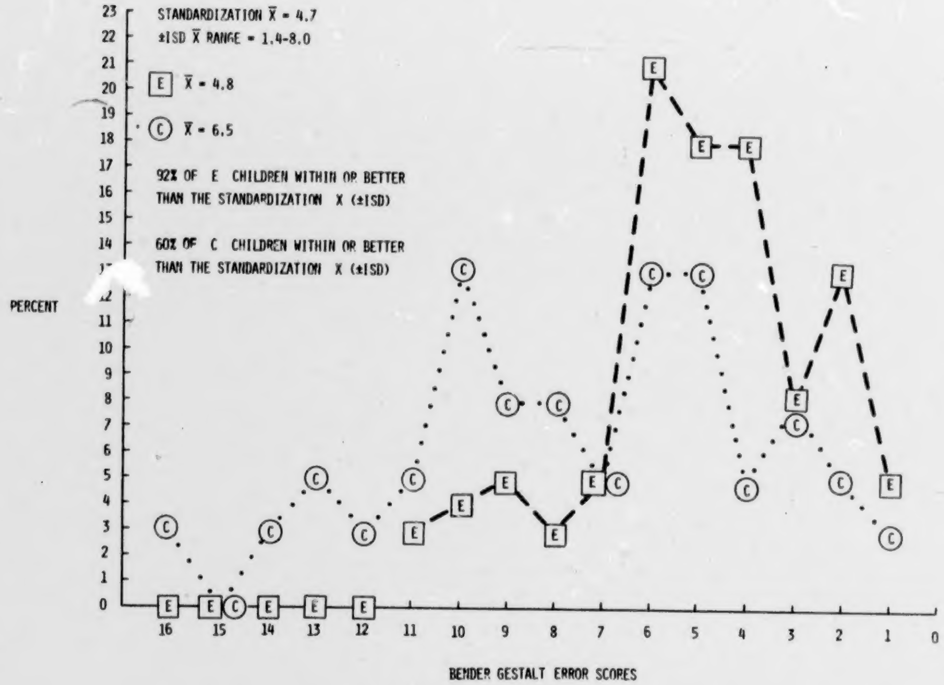


E =12.3	E =6.3	E =4.8
C =16.2	C =10.0	C =7.4

SD $\bar{X}$ = 9.8 SD $\bar{X}$ = 6.4 SD $\bar{X}$ = 4.7

FIGURE 25

A POST SECOND GRADE COMPARISON BETWEEN THE E
AND C GROUPS IN PERCEPTUAL MOTOR ABILITY.



% WITHIN E DISTRIBUTION	0%	0%	0%	0%	0%	3%	4%	5%	3%	5%	21%	18%	18%	8%	13%	5%
% WITHIN C DISTRIBUTION	3%	0%	3%	5%	3%	5%	13%	8%	8%	5%	13%	13%	5%	8%	5%	3%

grade. Their grade level in reading was approximately one and one-half years above that achieved by the control children.

The evaluation of the language measures reveals similar consistent results. The children in the E group have developed language competencies encompassing the capabilities to express themselves, to comprehend written and spoken material, to use verbal reasoning ability, and to handle verbal concepts. The E children possess language abilities at the end of second grade that are commensurate with the skills necessary for academic achievement at their grade level. Their facility with both language concepts and language performance measures indicate that they have functional use of language as it relates to the symbolic representation of concepts in both spoken and written form. This, however, does not hold true for the matched treatment controls whose language performance is indicative of children with difficulties in communication and comprehension in both speaking and writing.

The results of the arithmetic measures used in this evaluation indicate that the Learning to Learn children have mastered both the computational and symbolic aspects of arithmetic that are appropriate for their age. By the end of second grade these children have the ability, not only to add and subtract, but also to make correct mathematical statements. Their performance on group and individual measures of arithmetic ability approach grade level and is approximately one and one-half grade levels higher than the controls.

The E children's success in academic achievement is also indicated by their school grades at the end of second grade; one year after termination of the Learning to Learn Project. The children who participated in the experimental program received higher grades than their controls. Ninety-five percent of the children in the E group received letter grades of A, B, or C in their academic subjects. The E children were also rated higher by their teachers on achievement related behavior and self concept.

The E children's performance on the Bender Gestalt Test is well within the standardization norms for the measure, indicating that they are relatively free of any perceptual motor disorders. The C children's performance on the Bender indicates that approximately 50 percent of them are experiencing some difficulty in perceptual motor skills.

In conclusion the results of this chapter indicate that the E children are achieving at an academic level commensurate with educational success. The sequential early childhood Learning to Learn Program has had a significant and positive impact on the cognitive, educational, and personal-social development of these poverty children.

The children who participated in traditional early childhood programs, however, did not fare as well. The educational outcomes for the C group indicate that at the end of second grade these children are educationally high-risk and are experiencing a great many intellectual, educational, and personal-social problems in public schools.

CHAPTER VI

Long Term Effects of Early Childhood Education in Terms of Children's Initial Ability Levels

Introduction

It is desirable that an early childhood education program insure some measure of continuing success in the public schools for its participants. Therefore, it is important for educators and researchers involved in the development of early childhood education programs for poverty children to be able to ascertain and predict the extent to which poverty children of different initial ability levels will benefit from such programs. In order to give some indication of the longitudinal effects of the two early childhood education approaches in this study the analyses in this chapter were performed. The basis selected for predicting school success was the children's level of intellectual functioning prior to their participation in either the Learning to Learn Program or traditional early childhood education experiences. The experimental and control groups were divided into two groups each: one composed of children whose pre-project Stanford Binet scores were below the average range of intelligence (89 or below) and the other composed of children who pre-project Stanford Binet scores were within or above the average range of intelligence (90 or above). Analyses of the post-second grade performance of these four groups on various intellectual, achievement, and social measures were performed and the results compared to standardization norms for the measures.

Results

At the beginning of this project 54 percent of the children in the experimental group were below the average range of intelligence (Binet IQ 89 or below), and 46 percent were within or above the average range of intelligence (Binet IQ 90 or above).

Fifty-two percent of the children in the control groups were below average intelligence and 48 percent scored at 90 or above on the pre-project testing. (Refer to Tables 5 and 6).

TABLE 5

Percentages of Experimental and Control Groups Scoring Below Average (89 or Below) on Pre-Project Stanford Binet Testing and Mean Stanford Binet IQ Scores of Below Average Subgroups

Group	Percentage	$\overline{X}$ SBIQ
E	54	80
C	52	85

TABLE 6

Percentages of Experimental and Control Groups Scoring Average or Above (90 or Above) on Pre-Project Stanford Binet Testing and Mean Stanford Binet IQ Scores of Average or Above Subgroups

Group	Percentage	$\overline{X}$ SBIQ
E	46	100
C	48	98

Intelligence

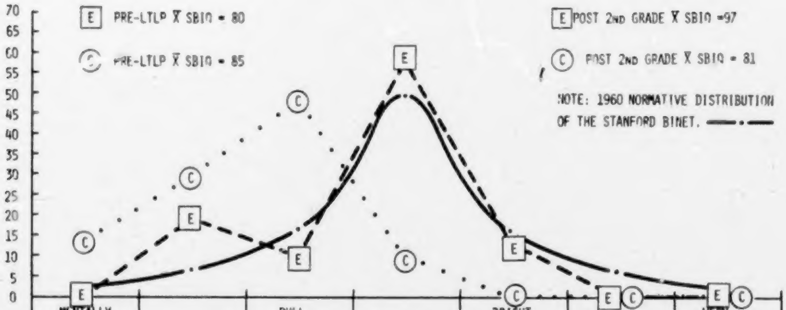
Of the experimental children who scored below average on initial testing, 71 percent were within or above the average range of intelligence at the end of second grade on the Stanford Binet (Figure 26a). Eighty-one percent were within or above the average range of intelligence on the WISC-Verbal Scales (Figure 27a), and 43 percent were within this range on the Primary Mental Abilities Test (Figure 28b).

However, the C children who were initially below average intelligence and participated in traditional preschool educational experiences did not make the same advances. By the end of second grade only 10 percent of them were within or above the average range of intelligence on the Stanford Binet (Figure 26a); 24 percent were average or above on the WISC-Verbal Scales (Figure 27a); and 15 percent on the Primary Mental Abilities (Figure 28b). Close inspection of the lower ends of the Primary Mental Abilities distribution comparison (Figure 28b) show that 55 percent of these controls were within the mentally defective range of intelligence as compared to only 14 percent of these experimental children.

By the end of second grade what has happened to the E and C children who entered preschool within or above the average range of intelligence? One hundred percent of those who participated in the Learning to Learn Program were still within or above the average range of intelligence on both the Stanford Binet and the WISC-Verbal Scales (Figures 26b and 27b), and 94 percent of them were within or above the average range of intelligence on the school related measure of intelligence, Primary Mental Abilities Test (Figure 28a). These results indicate that the Learning to Learn Program has maintained and enhanced these childrens' intellectual functioning. However, at the end of second grade dissimilar results are found for those children who began above 90 in the control groups. Only 56 and 50 percent of these C children were still within or above the average range of intelligence on the Stanford Binet and WISC-Verbal Scales respectively (Figures 26b and 27b). On the Primary Mental Abilities Test only 17 percent were within or above the average range of intelligence

FIGURE 26a

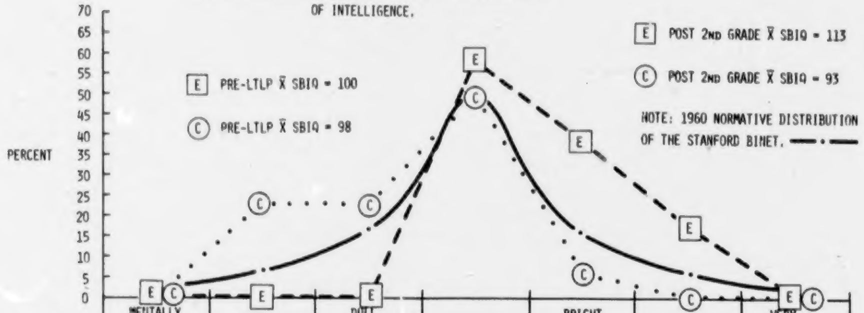
A POST SECOND GRADE STANFORD BINET COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



IQ CLASSIFICATION	MENTALLY DEFECTIVE	BORDERLINE	DULL NORMAL	AVERAGE	BRIGHT NORMAL	SUPERIOR	VERY SUPERIOR
IQ DISTRIBUTION RANGE	69	70-79	80-89	90-109	110-119	120-129	130
% WITHIN NORMAL DISTRIBUTION	2.2%	6.7%	16.1%	50%	16.1%	6.7%	2.2%
% WITHIN E DISTRIBUTION	0%	19%	10%	58%	13%	0%	0%
% WITHIN C DISTRIBUTION	13%	29%	49%	10%	0%	0%	0%

FIGURE 26b

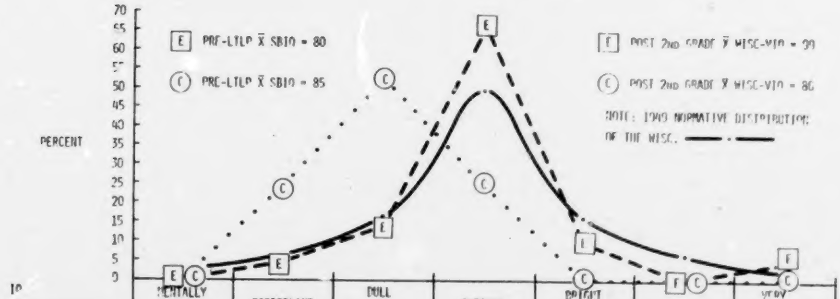
A POST SECOND GRADE STANFORD BINET COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



IQ CLASSIFICATION	MENTALLY DEFECTIVE	BORDERLINE	DULL NORMAL	AVERAGE	BRIGHT NORMAL	SUPERIOR	VERY SUPERIOR
IQ DISTRIBUTION RANGE	69	70-79	80-89	90-109	110-119	120-129	130
% WITHIN NORMAL DISTRIBUTION	2.2%	6.7%	16.1%	50%	16.1%	6.7%	2.2%
% WITHIN E DISTRIBUTION	0%	0%	0%	58%	39%	17%	0%
% WITHIN C DISTRIBUTION	0%	22%	22%	50%	6%	0%	0%

FIGURE 27a

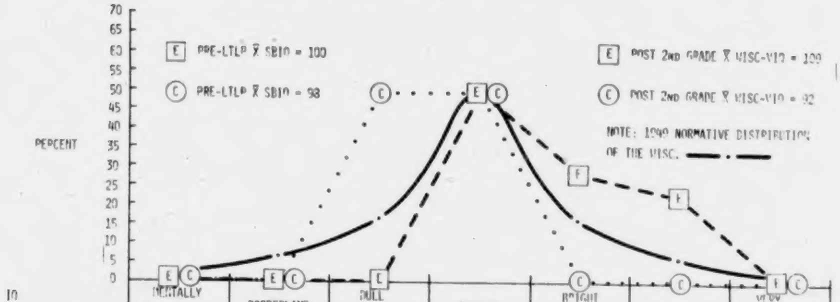
A POST SECOND GRADE WISC-VIQ COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



IQ CLASSIFICATION	MENTALLY DEFECTIVE	BORDERLINE	DULL NORMAL	AVERAGE	BRIGHT NORMAL	SUPERIOR	VERY SUPERIOR
IQ DISTRIBUTION RANGE	69	70-79	80-89	90-109	110-119	120-129	130
% WITHIN NORMAL DISTRIBUTION	2.2%	6.7%	16.1%	50%	16.1%	6.7%	2.2%
% WITHIN E DISTRIBUTION	0%	5%	14%	66%	10%	0%	5%
% WITHIN C DISTRIBUTION	0%	24%	52%	24%	0%	0%	0%

FIGURE 27b

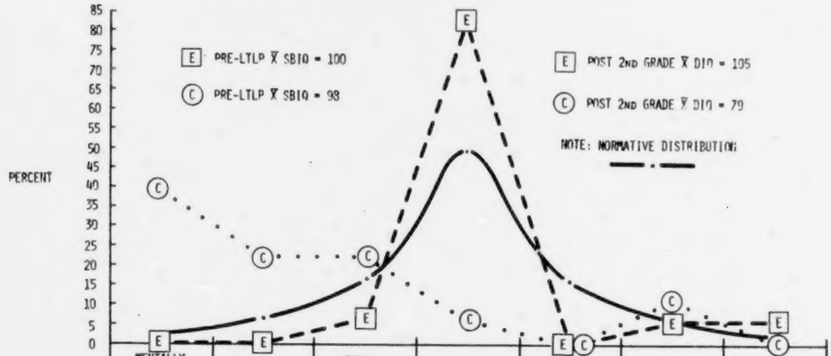
A POST SECOND GRADE WISC-VIQ COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE IN INTELLIGENCE.



IQ CLASSIFICATION	MENTALLY DEFECTIVE	BORDERLINE	DULL NORMAL	AVERAGE	BRIGHT NORMAL	SUPERIOR	VERY SUPERIOR
IQ DISTRIBUTION RANGE	69	70-79	80-89	90-109	110-119	120-129	130
% WITHIN NORMAL DISTRIBUTION	2.2%	6.7%	16.1%	50%	16.1%	6.7%	2.2%
% WITHIN E DISTRIBUTION	0%	0%	0%	50%	28%	22%	0%
% WITHIN C DISTRIBUTION	0%	0%	50%	50%	0%	0%	0%

FIGURE 28a

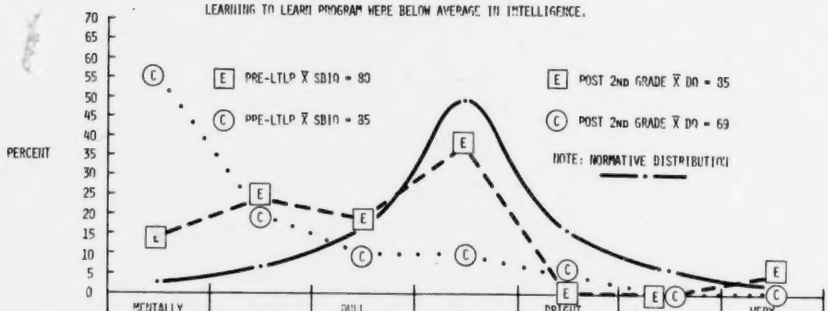
A POST SECOND GRADE PMA DEVIATION-IQ COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



IQ CLASSIFICATION	MENTALLY DEFECTIVE	BORDERLINE	DULL NORMAL	AVERAGE	BRIGHT NORMAL	SUPERIOR	VERY SUPERIOR
IQ DISTRIBUTION RANGE	69	70-79	80-89	90-109	110-119	120-129	130
% WITHIN NORMAL DISTRIBUTION	2.2%	6.7%	16.1%	50%	16.1%	6.7%	2.2%
% WITHIN E DISTRIBUTION	0.0%	0.0%	6.0%	82.0%	0.0%	6.0%	6.0%
% WITHIN C DISTRIBUTION	39.0%	22.0%	22.0%	6.0%	0.0%	11.0%	0.0%

FIGURE 28b

A POST SECOND GRADE PMA DEVIATION-IQ COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



IQ CLASSIFICATION	MENTALLY DEFECTIVE	BORDERLINE	DULL NORMAL	AVERAGE	BRIGHT NORMAL	SUPERIOR	VERY SUPERIOR
IQ DISTRIBUTION RANGE	69	70-79	80-89	90-109	110-119	120-129	130
% WITHIN NORMAL DISTRIBUTION	2.2%	6.7%	16.1%	50.0%	16.1%	6.7%	2.2%
% WITHIN E DISTRIBUTION	14.0%	24.0%	19.0%	38.0%	0.0%	0.0%	5.0%
% WITHIN C DISTRIBUTION	55.0%	20.0%	10.0%	10.0%	5.0%	0.0%	0.0%

(Figure 28a). In fact, only 50 percent of the controls initially within or above the average range in intelligence were still functioning in this range at the end of second grade. The prognosis for those poverty children initially tested in the below average range of intelligence is even more dismal. Traditional preschool programs, in contrast to the Learning to Learn Program, have not enhanced the performance of these children.

Thus, the study indicates that the Learning to Learn Program has been effective in maintaining and fostering intellectual growth for the children who participated in it, whatever their initial intelligence indicated by testing prior to their early childhood educational experiences. This cannot be said for those poverty children who participated in traditional early childhood programs.

Achievement

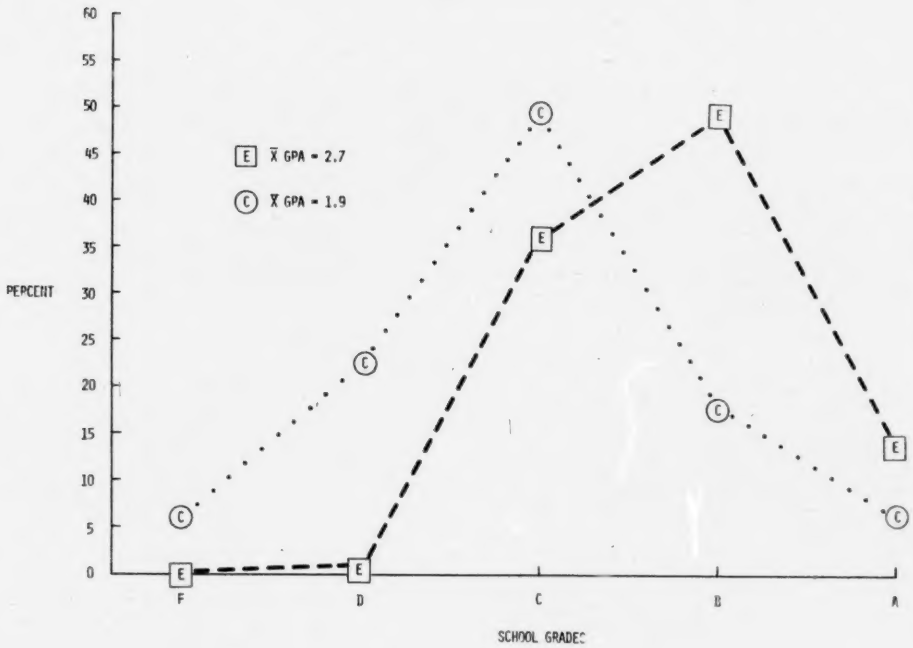
The results indicated by intelligence measures were reflected in the academic achievement of the children. Ninety-nine percent of the experimental group who had average or above pre-project IQ scores received letter grades of A, B, or C in their academic subjects at the end of second grade (Figure 29a). This compares to 73 percent for their controls. Twenty-eight percent of the controls who were initially within or above the average range of intelligence received D's or E's in their academic subject matter, and there is approximately one letter grade difference in the academic performance of these experimental and control children.

In comparing the achievement of the children who were initially below the average range of intelligence, the gains of this experimental group are even more striking. At the end of second grade 95 percent of these children who had participated in the Learning to Learn Program received A's, B's, or C's in their academic subjects, in contrast to only 54 percent of their controls. Forty-seven percent of these control children were experiencing educational difficulty at the end of second grade as indicated by grades of D and E in their academic subjects (Figure 29b).

Administration of the Stanford Achievement Test yielded similar results. Figure 30a shows that at the end of second grade 80 percent of the experimental group with initial IQ scores of 90 or above were within six months of grade level on this measure with a mean grade level of 2.7 as compared to only 34 percent of their controls who had a Stanford Achievement Test grade level score of 1.9. Twenty-eight percent of the C children who demonstrated academic potential prior to the program were now functioning between one and one and one-half years below grade level as compared to only 3 percent for their experimental counterparts.

FIGURE 29a

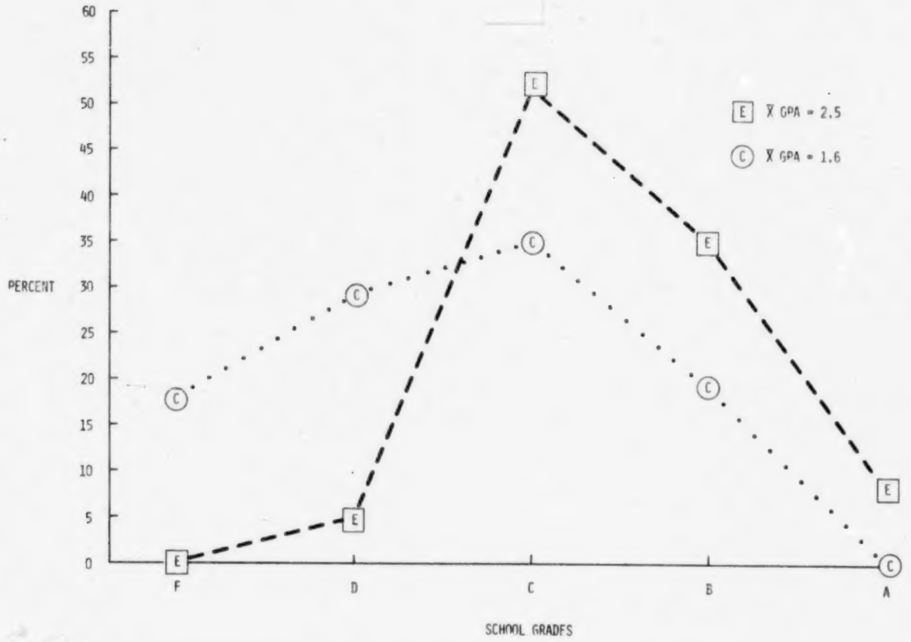
A POST SECOND GRADE ACADEMIC SUBJECT GRADE COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	1%	36%	49%	14%
% WITHIN C DISTRIBUTION	6%	22%	49%	18%	6%

FIGURE 29b

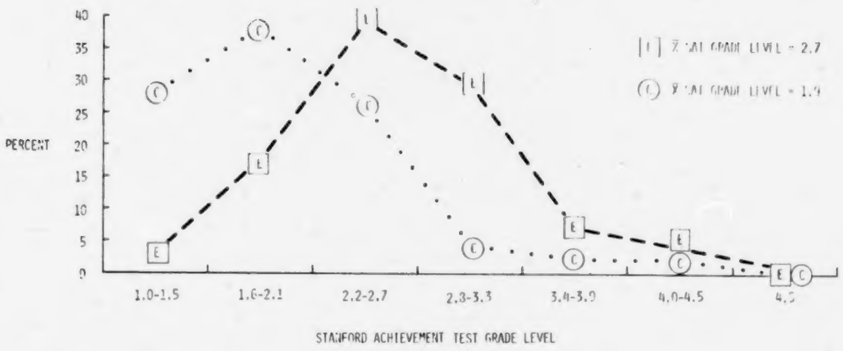
A POST SECOND GRADE ACADEMIC SUBJECT GRADE COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	5%	52%	35%	8%
% WITHIN C DISTRIBUTION	18%	29%	35%	19%	0%

FIGURE 30a

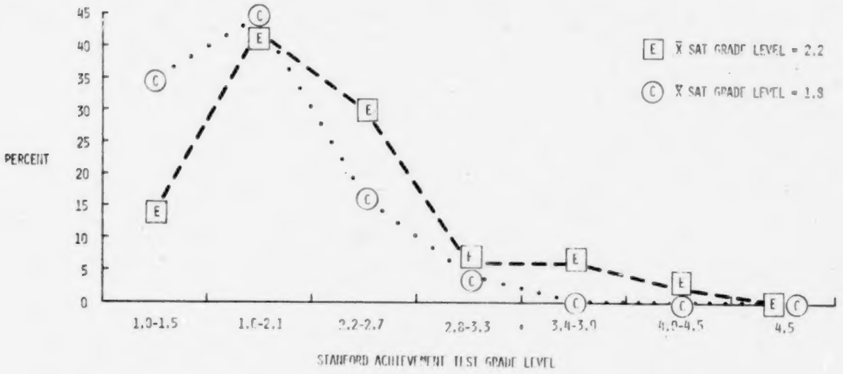
A POST SECOND GRADE STANFORD ACHIEVEMENT TEST DISTRIBUTION COMPARISON BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE LTLP WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	3%	17%	39%	29%	7%	4%	1%
% WITHIN C DISTRIBUTION	28%	38%	26%	4%	2%	2%	0%

FIGURE 30b

A POST SECOND GRADE STANFORD ACHIEVEMENT TEST DISTRIBUTION COMPARISON BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE LTLP WERE BELOW THE AVERAGE RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	14%	42%	30%	6%	6%	2%	0%
% WITHIN C DISTRIBUTION	35%	44%	16%	4%	1%	0%	0%

The performance on the Stanford Achievement Test of the E children whose initial IQ levels were below average shows that 44 percent of them scored within six months of grade level compared to 21 percent of the controls who were initially below average on intelligence measures (Figure 30b). Thirty-five percent of these control children were a year to a year and a half below grade level compared to only 14 percent for these E children.

Reading Ability

A breakdown of skills gives an even more detailed picture of the differential achievement of the experimental and control groups. At the end of second grade 100 percent of the E children who were initially within or above the average range of intelligence received grades of A, B, or C in reading and were reading above grade level as measured by the Spache Diagnostic Reading Scales (Figures 31a and 32a). Their mean reading grade point average was 2.7 (B) as compared to 1.7 (C) for their controls. Thirty-nine percent of the C group with initial IQ scores of 90 or above were reading better than grade level at the end of second grade with 61 percent receiving grades of A, B, or C.

When one makes similar comparisons (Figures 31b and 32b) between the E and C children who were below average intelligence before the project began, 52 percent of these E children are now reading at or above grade level as compared to only 15 percent of these C children. Ninety-five percent of the children in this experimental subgroup received reading grades of A, B, or C in second grade as compared to 45 percent of their controls.

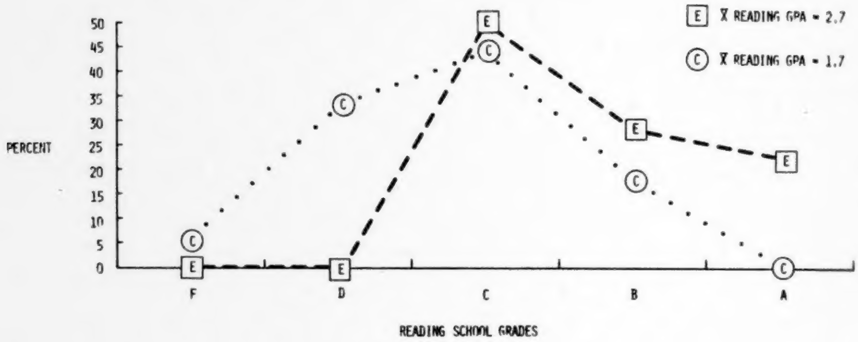
Arithmetic

The distribution comparisons on the arithmetic measures for the E children whose initial IQ was 90 or above are presented in Figures 33b, 34a, 35a. These figures indicate that 100 percent of these E children received letter grades of A, B or C in arithmetic with a mean grade point average of 3.1. Eighty-eight percent of these E children were above age-appropriate norms on the arithmetic subtest of the WISC, with a mean scale score of 12.1. Ninety percent were within six months of grade level on the arithmetic subtests of the Stanford Achievement Test, with a mean grade level of 2.7.

[illegible] for this same subgroup of C children shows that 79 percent of them received letter grades of A, B, or C. However, comparing the groups on only letter grades A and B, 83 percent of these E children received letter grades of A or B as compared to only 12 percent of their controls. Fifty percent of these controls were above the average age-appropriate norms on the arithmetic subtest of the WISC with a mean scale score of 9.4. Only 32 percent were within six months of grade level or better on the Arithmetic subtests of Stanford Achievement Test with a mean grade level of 1.8.

FIGURE 31a

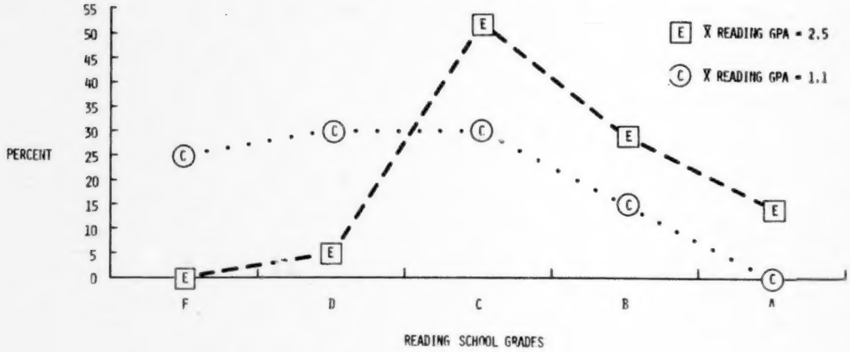
A POST SECOND GRADE READING GRADE DISTRIBUTION COMPARISON BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE LTLP WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	0%	50%	28%	22%
% WITHIN C DISTRIBUTION	6%	33%	44%	17%	0%

FIGURE 31b

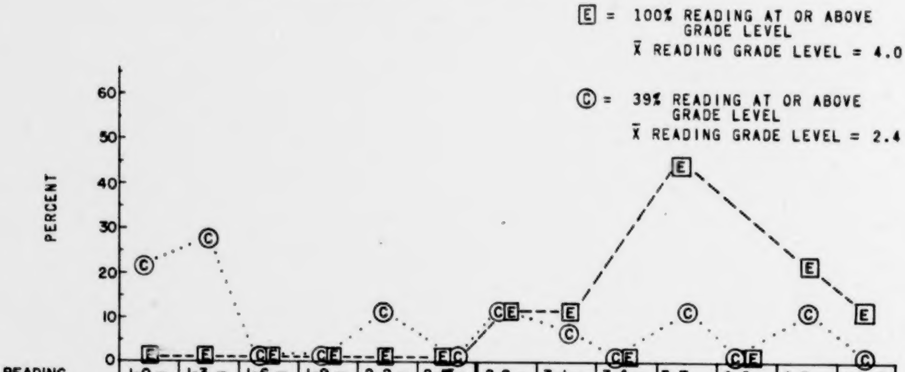
A POST SECOND GRADE READING GRADE DISTRIBUTION COMPARISON BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	5%	52%	29%	14%
% WITHIN C DISTRIBUTION	25%	30%	30%	15%	0%

FIGURE 32a

A POST SECOND GRADE READING ABILITY DISTRIBUTION
COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL
GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM
WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE



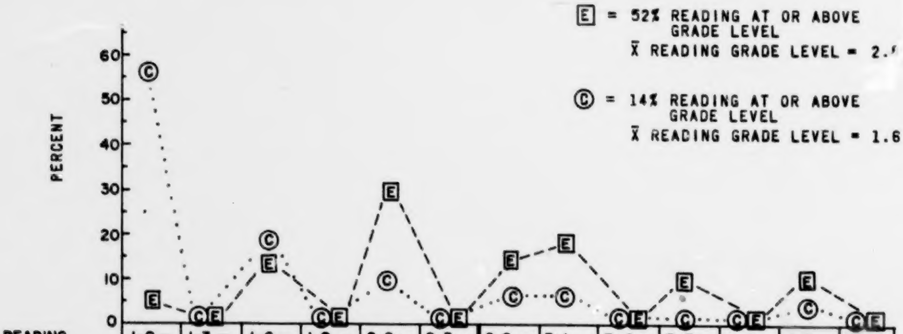
E = 100% READING AT OR ABOVE GRADE LEVEL
X̄ READING GRADE LEVEL = 4.0

C = 39% READING AT OR ABOVE GRADE LEVEL
X̄ READING GRADE LEVEL = 2.4

READING GRADE LEVEL	1-0 – 1-2	1-3 – 1-5	1-6 – 1-8	1-9 – 2-1	2-2 – 2-4	2-5 – 2-7	2-8 – 3-0	3-1 – 3-3	3-4 – 3-6	3-7 – 3-9	4-0 – 4-2	4-3 – 4-5	>4-6
% WITHIN E DISTRIBUTION	0%	0%	0%	0%	0%	0%	11%	11%	0%	44%	0%	22%	11%
% WITHIN C DISTRIBUTION	22%	28%	0%	0%	11%	0%	11%	6%	0%	11%	0%	11%	0%

FIGURE 32b

A POST SECOND GRADE READING ABILITY DISTRIBUTION
COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL
GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM
WERE BELOW AVERAGE IN INTELLIGENCE



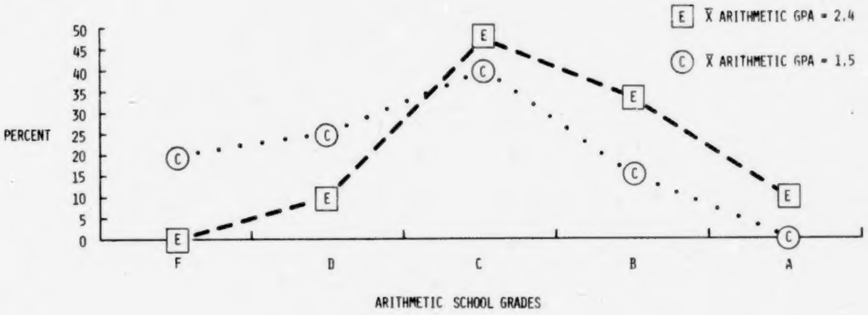
E = 52% READING AT OR ABOVE GRADE LEVEL
X̄ READING GRADE LEVEL = 2.

C = 14% READING AT OR ABOVE GRADE LEVEL
X̄ READING GRADE LEVEL = 1.6

READING GRADE LEVEL	1-0 – 1-2	1-3 – 1-5	1-6 – 1-8	1-9 – 2-1	2-2 – 2-4	2-5 – 2-7	2-8 – 3-0	3-1 – 3-3	3-4 – 3-6	3-7 – 3-9	4-0 – 4-2	4-3 – 4-5	>4-6
% WITHIN E DISTRIBUTION	5%	0%	14%	0%	29%	0%	14%	19%	0%	10%	0%	10%	0%
% WITHIN C DISTRIBUTION	57%	0%	19%	0%	10%	0%	5%	5%	0%	0%	0%	5%	0%

FIGURE 33a

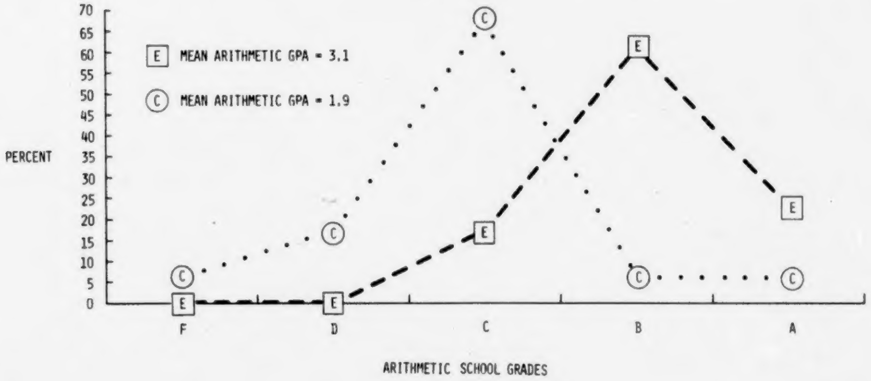
A POST SECOND GRADE ARITHMETIC GRADE DISTRIBUTION COMPARISON
BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO
THE LEARNING TO LEARN PROGRAM WERE OF BELOW AVERAGE INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	10%	47%	33%	10%
% WITHIN C DISTRIBUTION	20%	25%	40%	15%	0%

FIGURE 33b

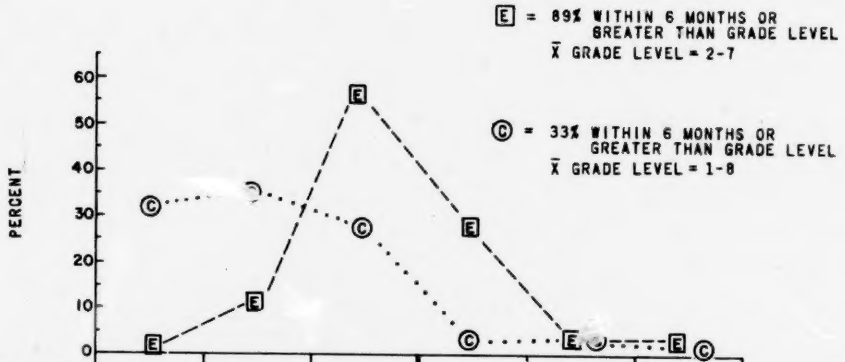
A POST SECOND GRADE ARITHMETIC GRADE DISTRIBUTION COMPARISON
BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE
LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE
RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	0%	17%	61%	22%
% WITHIN C DISTRIBUTION	6%	17%	67%	6%	6%

FIGURE 34a

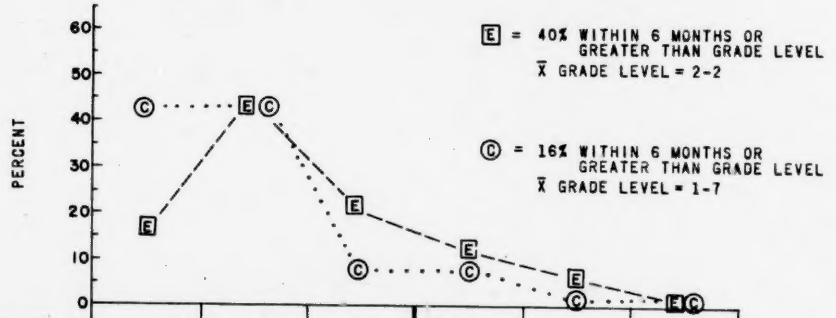
A POST SECOND GRADE ARITHMETIC ACHIEVEMENT DISTRIBUTION COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE



GRADE LEVELS	1-0 – 1-5	1-6 – 2-1	2-2 – 2-7	2-8 – 3-3	3-4 – 3-9	4-0 – 4-5
% WITHIN E DISTRIBUTION	0%	11%	56%	28%	3%	3%
% WITHIN Ⓒ DISTRIBUTION	32%	35%	26%	3%	3%	0%

FIGURE 34b

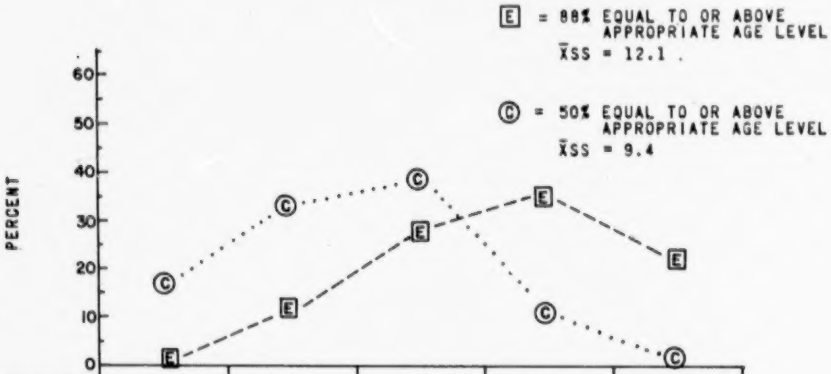
A POST SECOND GRADE ARITHMETIC ACHIEVEMENT DISTRIBUTION COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE



GRADE LEVELS	1-0 – 1-5	1-6 – 2-1	2-2 – 2-7	2-8 – 3-3	3-4 – 3-9	4-0 – 4-5
% WITHIN E DISTRIBUTION	17%	43%	21%	12%	7%	0%
% WITHIN Ⓒ DISTRIBUTION	43%	43%	8%	8%	0%	0%

FIGURE 35a

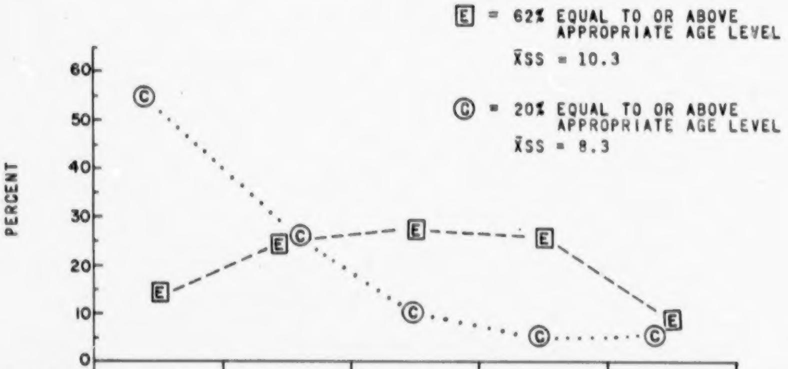
A POST SECOND GRADE WISC ARITHMETIC DISTRIBUTION COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE



SCALED SCORES	6-7	8-9	10-11	12-13	14-15
% WITHIN E DISTRIBUTION	0%	12%	29%	35%	23%
% WITHIN C DISTRIBUTION	17%	33%	39%	11%	0%

FIGURE 35b

A POST SECOND GRADE WISC ARITHMETIC DISTRIBUTION COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE



SCALED SCORES	6-7	8-9	10-11	12-13	14-15
% WITHIN E DISTRIBUTION	14%	24%	28%	24%	9%
% WITHIN C DISTRIBUTION	55%	25%	10%	5%	5%

Figures 33a, 34b, 35b, represent post-second grade arithmetic comparisons between the E and C subgroups of children who at the beginning of the project were of below average intelligence. Ninety percent of the E children in this group received letter grades of A, B, or C in arithmetic with a mean grade point average of 2.4. This compares to only 55 percent of their treatment controls who received letter grades of B or C with a mean grade point average of 1.5. No children in this C group received letter grades of A. It is important to note that 20 percent of these C children received letter grades of F in arithmetic, as compared to 0 percent for this E subgroup.

When comparing these E and C subgroups on the arithmetic subtest of the WISC at the end of second grade, 61 percent of these E children are functioning at or above age-appropriate norms as compared to only 20 percent for their controls (Figure 35b). Looking at the lowest category of scaled scores (6-7 range) on the arithmetic subtest only 14 percent of this E subgroup are in this scaled score range as compared to 55 percent for these controls. There is a 2.0 mean scale score difference between these two subgroups at the end of second grade.

Figure 34b represents the post-second grade distribution comparison between these E and C subgroups on the arithmetic subtests of the Stanford Achievement Test. At the end of second grade, 19 percent of these E children were achieving at or above grade level as compared to 8 percent for their controls. Forty percent of this E subgroup of children were performing within six months of grade level on this standardized measure of arithmetic achievement as compared to 16 percent for their controls.

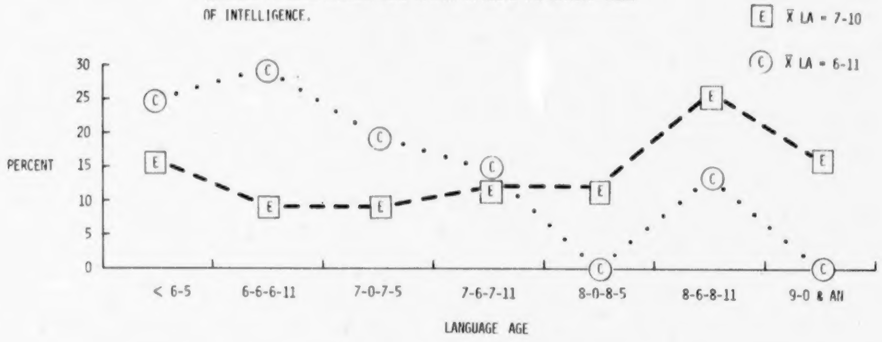
Language

Figure 36a represents a post-second grade language age distribution comparison between the E and C subgroups who at the beginning of the project were within or above the average range of intelligence. Fifty-four percent of these E children's language age was at or above their chronological age at the end of second grade. Their language age was 7 years and 10 months, approximately equal to their chronological age. The language age of these C children (IQ 90 >, pre-program) however, showed 13 percent at or above their chronological age at the end of second grade, with a mean language age of 6 years 11 months. There is approximately one year language age difference between the E and C children at the end of second grade.

When comparing the language age of the E and C subgroups who initially scored 89 or below intelligence, 40 percent of these E children were at or above chronological age by the end of the second grade. This compares to 14 percent for their controls. Further analysis shows that 49 percent of these C children are more than one and one-half years below chronological age as compared to 19 percent for these experimentals.

FIGURE 36a

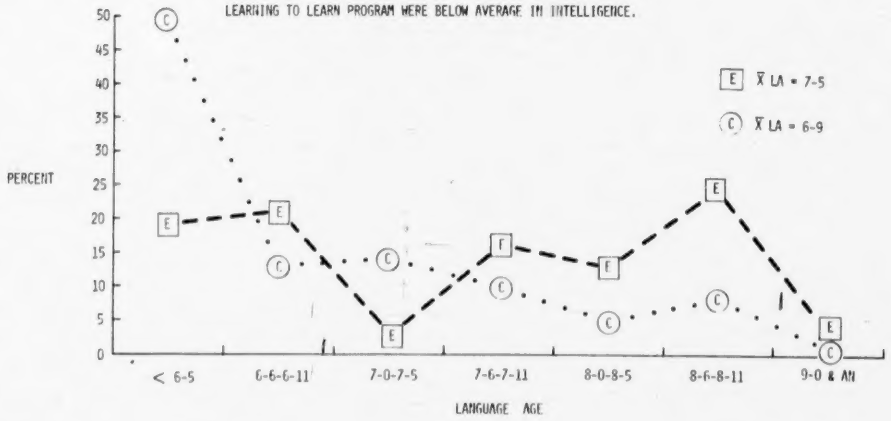
A POST SECOND GRADE I.T.P.A. LANGUAGE AGE DISTRIBUTION COMPARISON BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	16%	9%	9%	12%	12%	26%	16%
% WITHIN C DISTRIBUTION	25%	29%	19%	14%	0%	13%	0%

FIGURE 36b

A POST SECOND GRADE I.T.P.A. LANGUAGE AGE DISTRIBUTION COMPARISON BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



% WITHIN E DISTRIBUTION	19%	21%	3%	16%	13%	24%	3%
% WITHIN C DISTRIBUTION	49%	13%	14%	10%	5%	8%	1%

Figure 37a represents a post-second grade distribution comparison between the E and C subgroups of children (IQ 90 >,pre-program) on verbal language performance, as measured by their words-per-sentence (WPS). The E subgroup's (IQ 90 >,pre-program) mean word-per-sentence was approximately 48 percent greater than their controls at the end of second grade (E - WPS = 11.7; C - WPS = 7.9). These E children not only spoke longer sentences they also spoke 25 percent more sentences than their controls. Upon analyses of the E and C words-per-sentence distribution comparisons for the children who prior to the project were below average in intelligence similar findings occur. These E children's mean words-per-sentence for this subgroup was 22 percent greater than their controls at the end of second grade. They also spoke 46 percent more sentences in their verbal stories.

Figures 38a and 39a represent post-second grade written language comparisons between the E and C subgroups of children who prior to the project were within or above the average range of intelligence. This E subgroup's mean written words-per-sentence was 47 percent greater than their C and they used 50 percent more sentences in their written language. The brighter E children's mean syntax quotient is also 16 percentage points higher than their controls. The analysis of Figure 39a reveals that 59 percent of the higher E subgroup's syntax quotient is above the standardization norms as compared to 28 percent for their controls.

Similar results were found when comparing the E and C subgroups of children who were initially below average in intelligence. At the end of second grade this E subgroup of children used 90 percent more words in their written sentences, wrote 153 percent more sentences, and had a syntax quotient 126 percent greater than their controls.

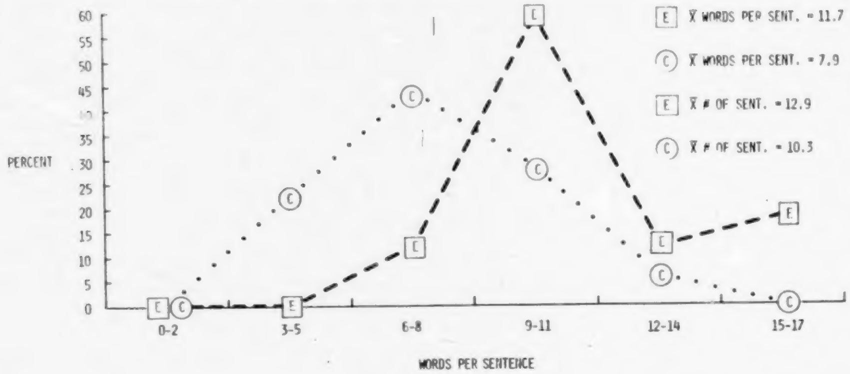
Figure 40 represents the post-second grade auditory discrimination comparison between E and C subgroups. Both E subgroups' (those whose pre-program IQ's were 90> and < 89) auditory discrimination ability were superior to their controls. Ninety-four percent and 69 percent of the E children respectively were free from auditory discrimination problems at the end of second grade as compared to 67 percent and 41 percent for their controls.

Self Concept

From inspection of Figure 41 it is apparent that E children who were initially within or above the average range of intelligence or those who were below average intelligence are now predominantly functioning with a positive attitude about themselves. This cannot be said, however, for the C children. Approximately 50 percent of all C children are functioning at this same level in self concept. Seventeen percent (90 >) and 10 percent (< 89) of the C children are functioning at test levels indicating self concepts that are severely detrimental. No E children are within this range.

FIGURE 37a

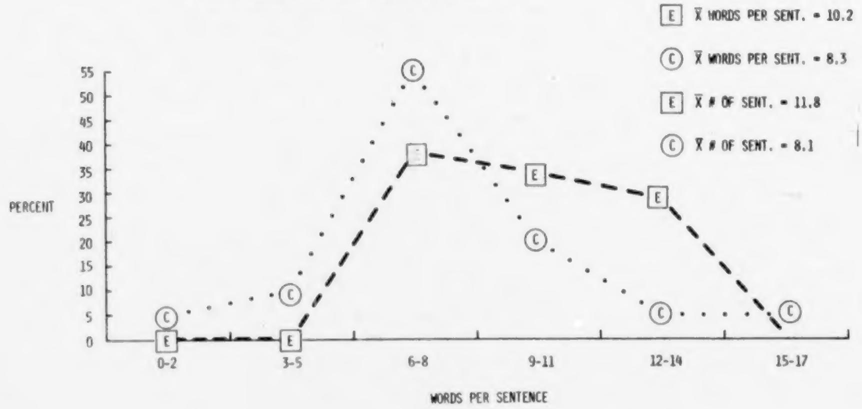
A POST SECOND GRADE VERBAL WORDS PER SENTENCE DISTRIBUTION COMPARISON BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	0%	12%	59%	12%	18%
% WITHIN C DISTRIBUTION	0%	22%	44%	28%	6%	0%

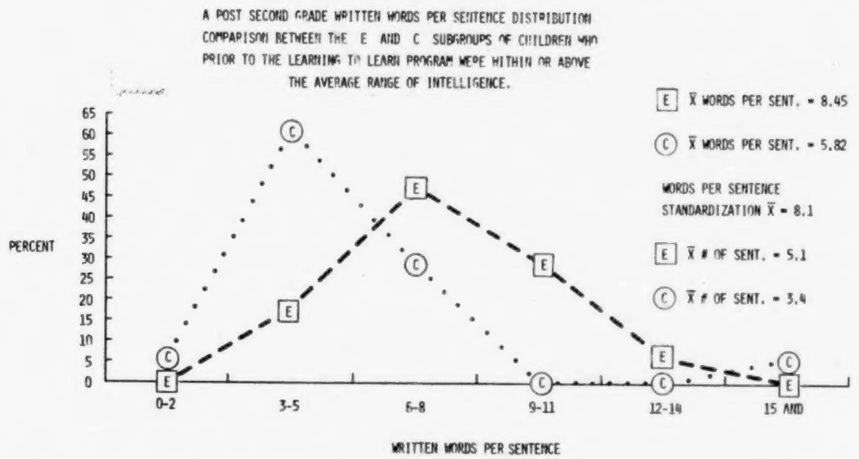
FIGURE 37b

A POST SECOND GRADE VERBAL WORDS PER SENTENCE DISTRIBUTION COMPARISON BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



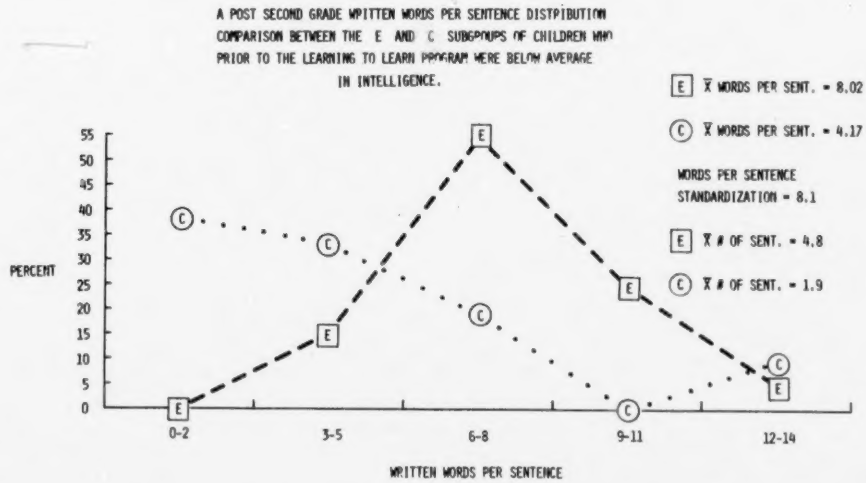
% WITHIN E DISTRIBUTION	0%	0%	38%	34%	29%	0%
% WITHIN C DISTRIBUTION	5%	10%	55%	20%	5%	5%

FIGURE 38a


A POST SECOND GRADE WRITTEN WORDS PER SENTENCE DISTRIBUTION COMPARISON BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.

% WITHIN E DISTRIBUTION	0%	18%	47%	29%	6%	0%
% WITHIN C DISTRIBUTION	5.55%	61%	28%	0%	0%	6%

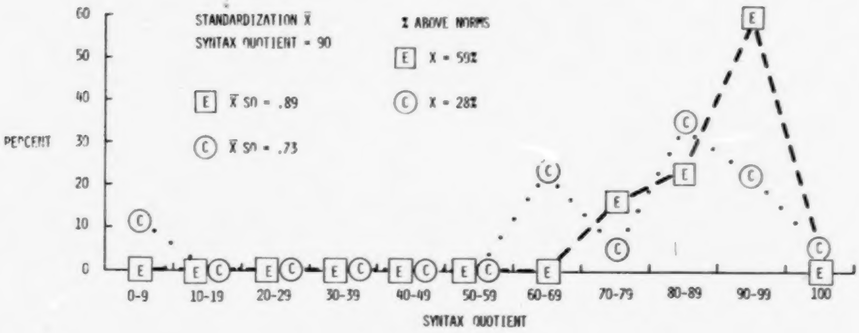
FIGURE 38b


A POST SECOND GRADE WRITTEN WORDS PER SENTENCE DISTRIBUTION COMPARISON BETWEEN THE E AND C SUBGROUPS OF CHILDREN WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.

% WITHIN E DISTRIBUTION	0%	15%	55%	25%	5%
% WITHIN C DISTRIBUTION	38%	33%	19%	0%	10%

FIGURE 39a

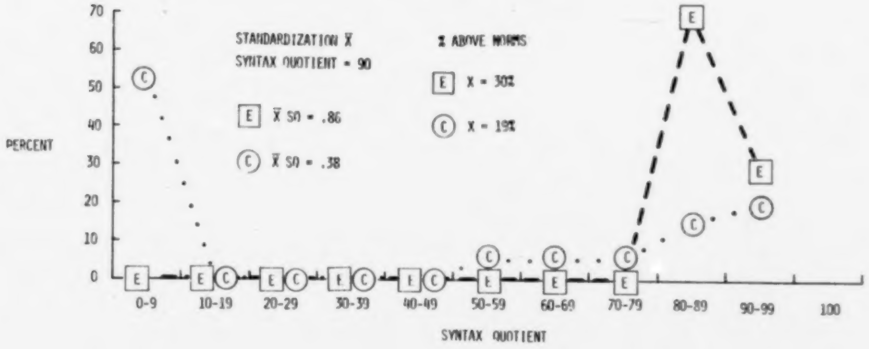
A POST SECOND GRADE SYNTAX QUOTIENT DISTRIBUTION COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	0%	0%	0%	0%	0%	0%	17.64%	23.52%	58.82%	0%
% WITHIN C DISTRIBUTION	11.11%	0%	0%	0%	0%	0%	22.22%	5.55%	33.33%	22.22%	5.55%

FIGURE 39b

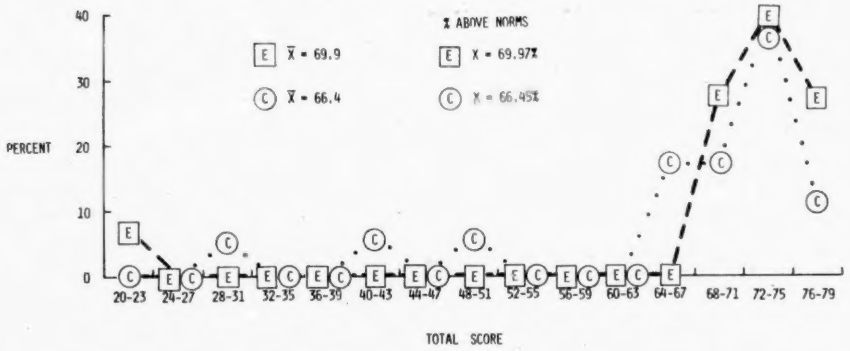
A POST SECOND GRADE SYNTAX QUOTIENT DISTRIBUTION COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	0%	0%	0%	0%	0%	0%	0%	70.00%	30.00%	
% WITHIN C DISTRIBUTION	52.38%	0%	0%	0%	0%	4.76%	4.76%	4.76%	14.28%	19.04%	

FIGURE 40a

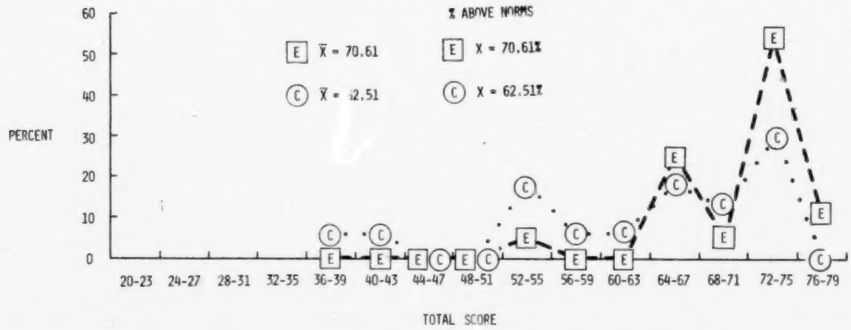
A POST SECOND GRADE AUDITORY DISCRIMINATION COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	27%	40%	27%
% WITHIN C DISTRIBUTION	0%	0%	5%	0%	0%	6%	0%	6%	0%	0%	0%	17%	17%	39%	11%

FIGURE 40b

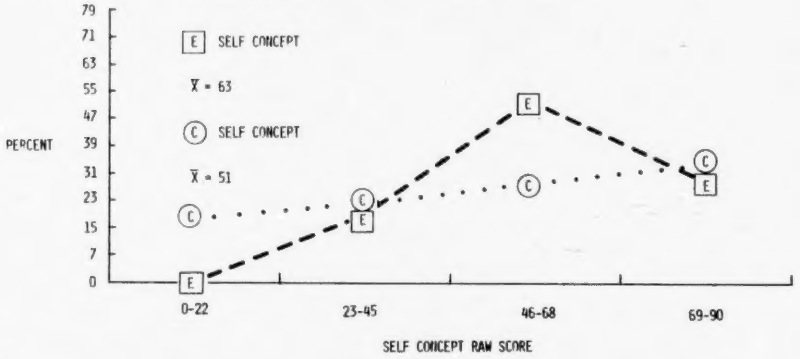
A POST SECOND GRADE AUDITORY DISCRIMINATION COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	0%	0%	0%	0%	0%	0%	0%	5.26%	0%	0%	26%	5%	53%	11%
% WITHIN C DISTRIBUTION	0%	0%	0%	0%	5.88%	5.88%	0%	0%	18%	6%	6%	18%	12%	29%	0%

FIGURE 41a

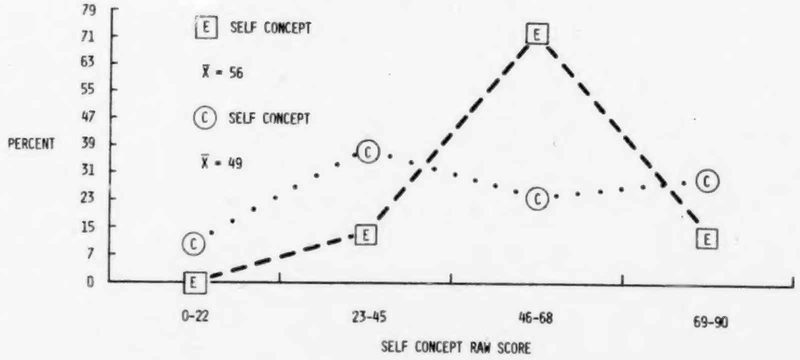
A POST SECOND GRADE SELF CONCEPT COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	18%	53%	29%
% WITHIN C DISTRIBUTION	17%	22%	28%	33%

FIGURE 41b

A POST SECOND GRADE SELF CONCEPT COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



% WITHIN E DISTRIBUTION	0%	14%	72%	14%
% WITHIN C DISTRIBUTION	10%	38%	24%	29%

Achievement Motivation

Turning to achievement motivation (Figure 42b) for the E children (90 >) 61 percent of their behavior was rated by their teachers as average or better, as compared to 40 percent for their controls. Of specific importance, however, is that only 4 percent of this E subgroup of children are rated in the lowest category (1) as compared to 29 percent for the controls.

Similar results occur for the lower E and C subgroups. Forty-six percent of these E children were rated average or above as compared to 35 percent for the controls. Thirteen percent of the E subgroup received ratings in the lowest category (1) as compared to 41 percent for the C subgroup.

Perceptual Motor Ability

A post-second grade comparison between the E and C brighter subgroups on the Bender Gestalt is presented in Figure 43a. Ninety-five percent of the E children in this subgroup were within the average range of functioning on the Bender Gestalt with a mean Bender Gestalt error score (BGES) of 4.5. This compared to only 68 percent of the C children whose mean Bender Score was 6.3.

The perceptual motor comparison between the subgroups who initially scored below 89 on the Binet indicates that 91 percent of the E children were within the average range of functioning on the Bender Gestalt with a mean error score of 5.1. This compares to 59 percent of the C who had a mean error score of 8.0.

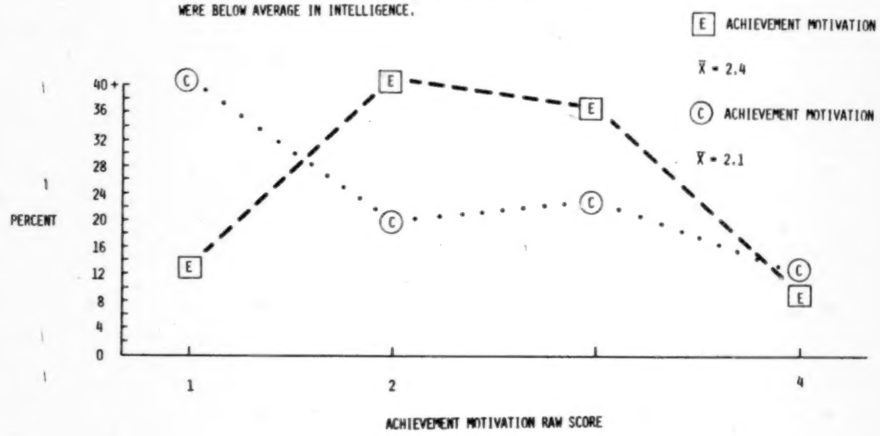
Figure 44 represents the longitudinal comparison between the E and C subgroups on the Bender Gestalt. It is apparent that the slopes of the E and C subgroups are quite similar at the end of kindergarten, first, and second grade, with the E subgroups mean Bender Gestalt error scores being significantly better than the controls.

Overall Summary

A major objective of this evaluation was to ascertain whether the Learning to Learn Program was effective in preparing and educating poverty children of different ability levels. Specifically we looked at those children who were below average on the pre-program Stanford Binet scores (89 or below) and those who were within the average or above range of intelligence (90 or above) in terms of their performance on various measures at the end of second grade. The results of the analysis performed in this chapter indicate that both the groups which participated in the Learning to Learn Program had made substantial progress. Their intelligence, academic achievement, reading, mathematical, language, personal-social skills and perceptual motor performance have all been enhanced. These children as a group are functioning at their

FIGURE 42a

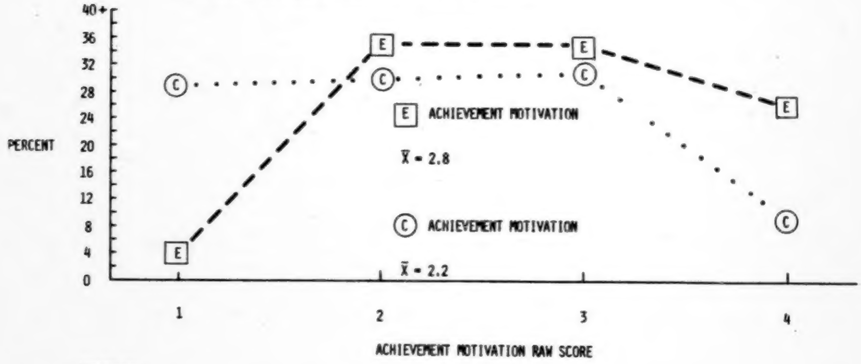
A POST SECOND GRADE ACHIEVEMENT MOTIVATION COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



% WITHIN E DISTRIBUTION	13%	41%	37%	9%
% WITHIN C DISTRIBUTION	41%	20%	23%	12%

FIGURE 42b

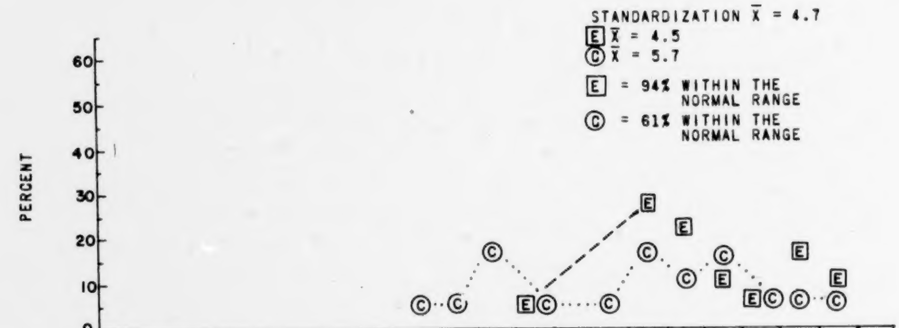
A POST SECOND GRADE ACHIEVEMENT MOTIVATION COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



% WITHIN E DISTRIBUTION	4%	35%	35%	26%
% WITHIN C DISTRIBUTION	29%	30%	31%	9%

FIGURE 43a

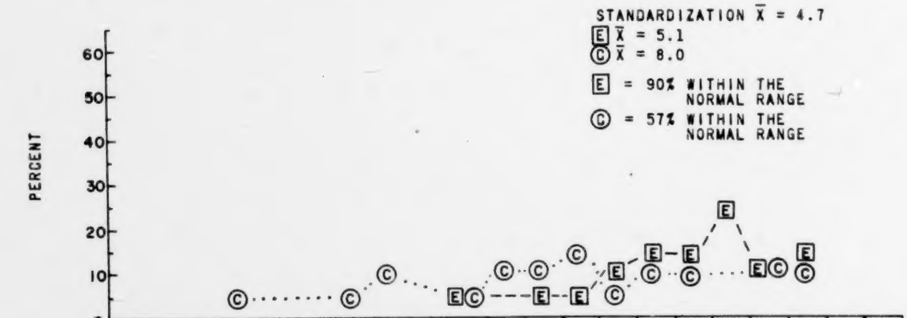
A POST SECOND GRADE PERCEPTUAL MOTOR SKILL DISTRIBUTION COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE



BGES	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
% WITHIN E DISTRIBUTION												6%			28%	22%	11%	6%	17%	11%	
% WITHIN C DISTRIBUTION									6%	6%	17%	6%		6%	17%	11%	16%	6%	6%	6%	

FIGURE 43b

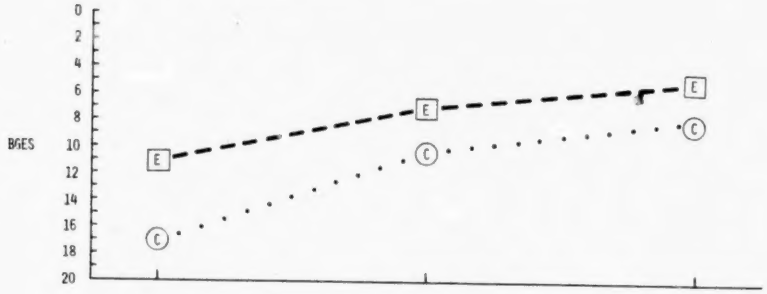
A POST SECOND GRADE PERCEPTUAL MOTOR SKILL DISTRIBUTION COMPARISON BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE



BGES	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
% WITHIN E DISTRIBUTION										5%		5%	5%	10%	14%	14%	24%	10%	14%		
% WITHIN C DISTRIBUTION				5%			5%	10%		5%	10%	10%	14%	5%	10%	10%		10%	10%		

FIGURE 44a

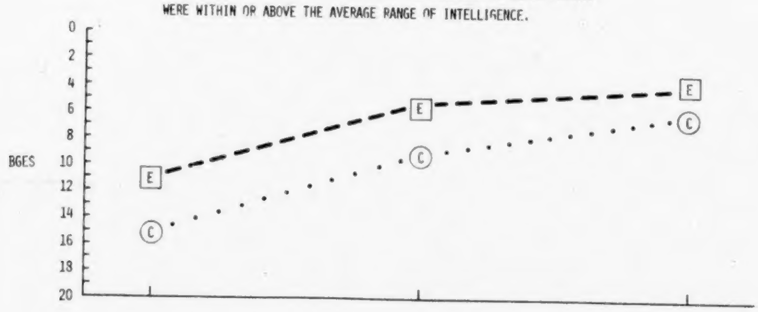
A POST SECOND GRADE BENDER GESTALT LONGITUDINAL COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE BELOW AVERAGE IN INTELLIGENCE.



BGES POST-KINDER	BGES POST 1st GRADE	BGES POST 2ND GRADE (1 YR. AFTER TERMINATION OF LTLP FOR E)
E = 11.0	E =7.0	E =5.1
C =17.2	C =10.6	C =8.0
SD $\bar{X}$ 9.8	SD $\bar{X}$ 6.4	SD $\bar{X}$ 4.7

FIGURE 44b

A POST SECOND GRADE BENDER GESTALT LONGITUDINAL COMPARISON BETWEEN THE E AND C GROUPS WHO PRIOR TO THE LEARNING TO LEARN PROGRAM WERE WITHIN OR ABOVE THE AVERAGE RANGE OF INTELLIGENCE.



BGES POST-KINDER	BGES POST 1st GRADE	BGES POST 2ND GRADE (1 YR. AFTER TERMINATION OF LTLP FOR E)
E =11.0	E =5.4	E =4.3
C =15.2	C =9.3	C =6.3
SD $\bar{X}$ 9.8	SD $\bar{X}$ 6.4	SD $\bar{X}$ 4.7

appropriate age levels at the end of second grade. Both subgroups have the rudiments of academic skills that are necessary for preparing them for the higher educaional complexities of the middle school grades.

The children who were in the treatment control subgroups and participated in traditional early childhood education programs are experiencing varying degrees of difficulties in intelligence, achievement related behavior, reading, arithmetic, language, and perceptual motor skills. They also do not have the personal-social characteristics that are essential to insuring educational success.

CHAPTER VII

Long Term Effects of Early Childhood Education
in Terms of Variant Program Length

Specific Hypotheses

The specific hypotheses for this evaluation were that:

I. At the end of third grade the E_5P_2 group would be developmentally and educationally superior to their matched treatment control group (C_5P_2) (two years after termination of the Learning to Learn Program).

II. At the end of second grade the E_4P_3 group would be developmentally and educationally superior to their matched treatment control group (C_4P_3) (one year after termination of the Learning to Learn Program).

III. At the end of second grade the E_4P_3 group would be developmentally and educationally superior to the E_5P_3 group.

IV. At the end of second grade there would be no developmental or educational difference between the control groups (C_4P_3 and C_5P_2).

The following developmental, intellectual, linguistic, personal-social, and educational characteristics were utilized to assess the above hypotheses.

Developmental Characteristics	Measures
Intellectual Functioning	
General intelligence	Stanford Binet Intelligence Scale Form L-M (Terman and Merrill, 1960)
Abstract Verbal Ability	Wechsler Intelligence Scale for Children (Verbal Subscales)
School Related Intelligence	Primary Mental Abilities II
School achievement and abilities	School grades in academic subjects (reading, arithmetic, language, writing)
	Stanford Achievement Test II
Reading ability	Spache Diagnostic Reading Scales
	School reading grades

Developmental Characteristics	Measures
Arithmetic ability	Arithmetic subtest of the WISC
	Arithmetic school grades
	Arithmetic subtests of the Stanford Achievement Test II
	Mathematics Performance Measure
Language ability	
The ability to express ideas	The Illinois Test of Psycholinguistic Abilities, (McCarthy & Kirk, 1961), Vocal Encoding Subtest
Language comprehension	The Illinois Test of Psycholinguistic Abilities, Auditory-Vocal Association Subtest
Verbal reasoning ability	The Illinois Test of Psycholinguistic Abilities, Visual-Decoding Subtest
Concept formation	The Illinois Test of Psycholinguistic Abilities, Visual-Motor Association Subtest
Language quality, quantity, performance, creativity, concrete and abstract usage, and Syntax Quotient	Ratings of written and spoken stories made by children
Ability to discriminate verbal messages	Wepman Auditory Discrimination Test (E_4P_3 and C_4P_3 only)
Personal-Social Characteristics	
Self concept	Florida Key
Achievement motivation	Ratings of children by their teachers
Parental attitudes and involvement in the education of their children	Parental Questionnaires (E_4P_3 and C_4P_3 only)
Perceptual Motor Ability	
Visual motor ability	Bender Gestalt

The specific hypotheses of this evaluation were not analyzed by parametric statistics due to the skewed distributions of the results obtained on the intellectual, linguistic, educational, and personal-social measures as manifested by the great variability in the standard deviations between groups. In a few instances the standard deviations were greater than the means for the particular measure. The lack of "homogenity of variance" in these data restricted the use of the analysis of variance statistical technique. As a consequence of these findings the non-parametric Mann-Whitney U statistical technique was employed to ascertain whether differences exist between the groups for the following comparisons: E_5P_2 and C_5P_2 post third grade; E_4P_3 and C_4P_3 post second grade; E_4P_3 and E_5P_2 post second grade; and C_4P_3 and C_5P_2 post second grade.

Comparisons between the E_5P_2 and C_5P_2 Groups at the end of third grade (two years after termination of the Learning to Learn Program).

The medians, Mann Whitney U's and levels of significance for the comparisons between the E_5P_2 and C_5P_2 groups are presented in Table 7 . The performance of the E_5P_2 group on the developmental and educational measures was statistically superior to the control group in 66 percent of the post third grade comparisons. Thus hypothesis I is strongly supported.

TABLE 7

A Post Third Grade Comparison between the E_5P_2 and C_5P_2 Groups on Intellectual, Achievement, Linguistic, and Personal-Social Measures

Measure	Grp.	N	Median	U_1	Level of Sign.
Intellectual Functioning					
General Intelligence					
SBIQ (Form L-M)	E_5P_2	15	99.0		
	C_5P_2	20	85.5	221.0	.05
Abstract Verbal Ability					
WISC VIQ	E_5P_2	15	105.0		
	C_5P_2	20	90.0	224.0	.05
School Related Intelligence					
PMA II					
Verbal Meaning	E_5P_2	15	41.0		
	C_5P_2	20	35.5	187.0	NS
Spatial Relations	E_5P_2	16	16.0		
	C_5P_2	20	14.5	170.5	NS
Number Facility	E_5P_2	15	34.0		
	C_5P_2	20	24.0	238.5	.05
Perceptual Speed	E_5P_2	15	22.0		
	C_5P_2	20	22.5	177.0	NS

TABLE 7 con't

Measure	Grp.	N	Median	U_1	Level of Sign.
School Achievement and Abilities					
Achievement					
School Grades					
Reading	E_5P_2	15	2.0		
	C_5P_2	19	2.0	221.5	.05
Language	E_5P_2	15	2.0		
	C_5P_2	19	2.0	186.5	NS
Spelling	E_5P_2	15	3.0		
	C_5P_2	19	1.0	227.0	.05
Writing	E_5P_2	15	3.0		
	C_5P_2	19	2.0	207.5	.05
Social Studies	E_5P_2	15	2.0		
	C_5P_2	19	2.0	205.0	.05
Science	E_5P_2	15	2.0		
	C_5P_2	19	2.0	201.0	.05
Math	E_5P_2	15	2.0		
	C_5P_2	19	2.0	202.5	.05
Health & Safety	E_5P_2	15	3.0		
	C_5P_2	19	2.0	206.5	.05
Physical Education	E_5P_2	15	3.0		
	C_5P_2	19	2.0	196.5	.05
Music	E_5P_2	15	3.0		
	C_5P_2	19	2.0	157.0	NS
Art	E_5P_2	15	3.0		
	C_5P_2	19	2.0	182.5	NS
Citizenship	E_5P_2	15	3.0		
	C_5P_2	19	2.0	193.0	NS
SAT II					
Word Meaning	E_5P_2	15	3.1		
	C_5P_2	19	2.3	224.5	.05
Paragraph Meaning	E_5P_2	15	3.4		
	C_5P_2	19	2.4	240.5	.05

TABLE 7 con't

Measure	Grp.	N	Median	U_1	Level of Sign.
School Achievement and Abilities					
Achievement					
SAT II					
Science & Social Studies Concepts	E_5P_2	15	2.6		
	C_5P_2	19	2.2	210.0	.05
Spelling	E_5P_2	15	3.6		
	C_5P_2	19	2.6	230.5	.05
Word Study Skills	E_5P_2	15	2.4		
	C_5P_2	19	2.2	187.5	NS
Language	E_5P_2	15	3.3		
	C_5P_2	19	2.5	206.0	.05
Arithmetic Computation	E_5P_2	15	3.2		
	C_5P_2	19	2.3	213.0	.05
Arithmetic Concepts	E_5P_2	15	2.9		
	C_5P_2	19	2.1	221.5	.05
Reading Ability					
Spache Diagnostic Reading Scales					
Word Recognition Level	E_5P_2	15	4.6		
	C_5P_2	20	2.4	215.0	.05
Instructional Level	E_5P_2	15	3.8		
	C_5P_2	20	2.3	215.0	.05
Potential Level	E_5P_2	15	4.5		
	C_5P_2	20	3.8	209.5	.05
School Grades in Reading	E_5P_2	15	2.0		
	C_5P_2	19	2.0	221.5	.05
Arithmetic Ability					
Arithmetic subtest of the WISC	E_5P_2	15	10.0		
	C_5P_2	20	8.0	187.5	NS
School Grades in Mathematics	E_5P_2	15	2.0		
	C_5P_2	19	2.0	202.5	.05
SAT II subtests					
Arithmetic Computation	E_5P_2	15	3.2		
	C_5P_2	19	2.3	213.0	.05
Arithmetic Concepts	E_5P_2	15	2.9		
	C_5P_2	19	2.1	221.5	.05

TABLE 7 con't

Measure	Grp.	N	Median	U_1	Level of Sign.
Language Ability					
Ability to Express Ideas					
ITPA-Vocal Encoding	E_5P_2	15	21.0		
	C_5P_2	20	18.5	221.5	.05
Language Comprehension					
ITPA-Auditory Vocal Assoc	E_5P_2	15	21.0		
	C_5P_2	20	20.0	199.5	NS
Verbal Reasoning Ability					
ITPA-Visual Decoding	E_5P_2	15	17.0		
	C_5P_2	20	17.0	164.0	NS
Concept Formation					
ITPA-Visual-Motor Assoc.	E_5P_2	15	21.0		
	C_5P_2	20	20.0	169.0	NS
Spoken Language Ability					
Verbal Stories					
Creativity	E_5P_2	14	5.0		
	C_5P_2	20	4.0	216.0	.05
Abstraction	E_5P_2	14	5.0		
	C_5P_2	20	4.0	189.0	NS
Language Quality	E_5P_2	14	5.0		
	C_5P_2	20	4.0	227.0	.05
Number of Words	E_5P_2	14	85.5		
	C_5P_2	20	59.5	165.0	NS
Number of Sentences	E_5P_2	14	7.0		
	C_5P_2	20	9.0	105.0	NS
Mean Length of Remark	E_5P_2	14	12.25		
	C_5P_2	20	7.68	250.5	.05
Written Language Ability					
Written Stories					
Total Words	E_5P_2	15	32.0		
	C_5P_2	20	14.0	246.5	.05
Total Sentences	E_5P_2	15	4.0		
	C_5P_2	20	2.5	229.0	.05
Words Per Sentence	E_5P_2	15	7.9		
	C_5P_2	20	6.2	231.5	.05

TABLE 7 con't

Measure	Grp.	N	Median	U_1	Level of Sign.
Language Ability					
Written Language Ability					
Written Stories					
Abstract-Concrete Level	E_5P_2	15	3.0		
	C_5P_2	20	3.0	218.0	.05
Abstract-Concrete Raw Score	E_5P_2	15	8.0		
	C_5P_2	20	7.0	244.0	.05
Syntax Quotient	E_5P_2	15	90.0		
	C_5P_2	20	72.0	215.5	.05
Personal-Social Characteristics					
Self Concept					
Florida Key	E_5P_2	15	55.5		
	C_5P_2	20	52.5	164.0	NS
Achievement Motivation					
Teachers' Ratings	E_5P_2	15	12.0		
	C_5P_2	20	10.0	169.0	NS
Perceptual-Motor Ability					
Bender Gestalt Test	E_5P_2	15	5.0		
	C_5P_2	20	6.0	124.0	NS

A comparison of the medians on the various measures of mathematics performance between the E_5P_2 and C_5P_2 groups is presented in Table 8 . The median comparisons for mathematical functions taught in first and second grade (addition problems, and percentage accurate) are quite similar for the E_5P_2 and C_5P_2 groups. However, when comparing the two groups on the more complex mathematical functions usually taught in third grade, (subtraction, multiplication, and greater than or less than problems), the E_5P_2 group has more children with greater ability to perform these arithmetic skills than their control group.

TABLE 8

A Descriptive Post Third Grade Comparison between the Experimental (E_5P_2) and Control (C_5P_3) Groups on Mathematics Performance Measure

Measures	Grp.	N	YATLTLP	Median
Problems Attempted	E_5P_2	15	2	27.0
	C_5P_2	20	NA	28.5
Problems Accurate	E_5P_2	15	2	24.0
	C_5P_2	20	NA	24.0
Addition Problems	E_5P_2	15	2	15.0
	C_5P_2	20	NA	18.5
Subtraction Problems	E_5P_2	15	2	3.0
	C_5P_2	20	NA	1.5
Multiplication Problems	E_5P_2	15	2	5.5
	C_5P_2	20	NA	1.5
Greater than or Less than Problems	E_5P_2	15	2	1.5
	C_5P_2	20	NA	0
Division Problems	E_5P2	15	2	0
	C_5P_2	20	NA	0

Comparisons between the E_4P_3 and the C_4P_3 Groups at the end of second grade (one year after termination of the Learning to Learn Program).

The medians, Z scores, and levels of significance for comparisons between the E_4P3 and C_4P_3 groups are presented in Table 9 . The performance of the E_4P_3 group on the developmental and educational measures was significantly superior to the control group in 61 percent of the post second grade comparisons. Thus hypothesis II is also strongly supported.

TABLE 9

A Post Second Grade Comparison between the E_4P_3 and C_4P_3 Groups on Intellectual, Achievement, Linguistic, and Personal-Social Measures

Measure	Grp.	N	Median	Z	Level of Sign.
Intellectual Functioning					
General Intelligence					
SBIQ (Form L-M)	E_4P_3	23	104.0		
	C_4P_3	19	80.0	-4.0	.05
Abstract Verbal Ability					
WISC VIQ	E_4P_3	23	101.0		
	C_4P_3	19	89.0	-3.5	.05
School Related Intelligence					
PMA II					
Verbal Meaning	E_4P_3	23	31.0		
	C_4P_3	18	28.5	-2.34	NS
Spatial Relations	E_4P_3	22	16.5		
	C_4P_3	19	13.0	-2.69	.05
Number Facility	E_4P_3	23	25.0		
	C_4P_3	18	13.5	-4.32	.05
Perceptual Speed	E_4P_3	23	21.0		
	C_4P_3	18	17.0	-2.68	.05
School Achievement and Abilities					
Achievement					
School Grades					
Reading	E_4P_3	22	3.0		
	C_4P_3	15	1.0	-4.0	.05
Language	E_4P_3	22	2.0		
	C_4P_3	15	2.0	-2.2	NS
Spelling	E_4P_3	22	2.0		
	C_4P_3	15	1.0	-3.4	.05
Writing	E_4P_3	22	2.0		
	C_4P_3	15	2.0	-0.8	NS
Social Studies	E_4P_3	22	2.0		
	C_4P_3	15	2.0	-0.4	NS
Science	E_4P_3	22	3.0		
	C_4P_3	15	2.0	-2.0	NS

TABLE 9 con't

Measure	Grp.	N	Median	Z	Level of Sign.
School Achievement and Abilities					
Achievement					
School Grades					
Math	E_4P_3	22	2.5		
	C_4P_3	15	2.0	-3.2	.05
Health & Safety	E_4P_3	22	2.0		
	C_4P_3	15	2.0	0.9	NS
Physical Education	E_4P_3	22	2.0		
	C_4P_3	15	2.0	1.2	NS
Music	E_4P_3	22	2.0		
	C_4P_3	15	2.0	2.2	NS
Art	E_4P_3	22	2.0		
	C_4P_3	15	2.0	1.9	NS
Citizenship	E_4P_3	22	2.0		
	C_4P_3	15	1.0	-2.7	.05
SAT II					
Word Meaning	E_4P_3	23	2.1		
	C_4P_3	19	1.8	-2.63	NS
Paragraph Meaning	E_4P_3	23	2.0		
	C_4P_3	19	1.6	-3.66	.05
Science & Social Studies Concepts	E_4P_3	23	2.2		
	C_4P_3	19	1.5	-2.90	.05
Spelling	E_4P_3	23	2.5		
	C_4P_3	19	1.7	-3.36	.05
Word Study Skills	E_4P_3	23	2.1		
	C_4P_3	19	1.7	-2.40	NS
Language	E_4P_3	23	2.3		
	C_4P_3	19	2.1	-1.51	NS
Arithmetic Computation	E_4P_3	23	2.3		
	C_4P_3	19	1.4	-3.15	.05
Arithmetic Concepts	E_4P_3	23	2.2		
	C_4P_3	19	1.6	-3.59	.05

TABLE 9 con't

Measure	Grp.	N	Median	Z	Level of Sign.
School Achievement and Abilities					
Reading Ability					
Spache Diagnostic Reading Scales					
Word Recognition Level	E_4P_3	23	3.2		
	C_4P_3	19	1.8	-3.7	.05
Instructional Level	E_4P_3	23	3.3		
	C_4P_3	19	1.6	-3.5	.05
Potential Level	E_4P_3	23	3.8		
	C_4P_3	19	3.3	-2.6	NS
School Grades in Reading	E_4P_3	22	3.0		
	C_4P_3	15	1.0	-4.0	.05
Arithmetic Ability					
Arithmetic subtest of the WISC	E_4P_3	23	11.0		
	C_4P_3	19	8.0	-3.3	.05
School Grades in Mathematics	E_4P_3	22	2.5		
	C_4P_3	15	2.0	-3.2	.05
SAT II subtests					
Arithmetic Computation	E_4P_3	23	2.3		
	C_4P_3	19	1.4	-3.15	.05
Arithmetic Concepts	E_4P_3	23	2.2		
	C_4P_3	19	1.6	-3.59	.05
Language Ability					
Ability to Express Ideas					
ITPA-Vocal Encoding	E_4P_3	23	21.0		
	C_4P_3	19	14.0	-3.6	.05
Language Comprehension					
ITPA-Auditory Vocal Assoc.	E_4P_3	23	22.0		
	C_4P_3	19	18.0	-3.5	.05
Verbal Reasoning Ability					
ITPA-Visual Decoding	E_4P_3	23	17.0		
	C_4P_3	19	15.0	-2.3	NS
Concept Formation					
ITPA-Visual-Motor Assoc.	E_4P_3	22	21.0		
	C_4P_3	19	18.0	-3.2	.05
Spoken Language Ability					
Verbal Stories					
Creativity	E_4P_3	22	5.0		
	C_4P_3	17	4.0	-2.99	.05

TABLE 9 con't

Measure	Grp.	N	Median	Z	Level of Sign.
Language Ability					
Spoken Language Ability					
Verbal Stories					
Abstraction	E_4P_3	22	5.0		
	C_4P_3	17	4.0	-2.79	.05
Language Ability	E_4P_3	22	5.0		
	C_4P_3	17	4.0	-2.92	.05
Number of Words	E_4P_3	22	126.5		
	C_4P_3	17	71.0	-2.65	.05
Number of Sentences	E_4P_3	22	12.0		
	C_4P_3	18	10.0	-2.09	NS
Mean Length of Remark	E_4P_3	22	10.6		
	C_4P_3	18	8.4	-1.94	NS
Written Language Ability					
Written Stories					
Total Words	E_4P_3	22	34.5		
	C_4P_3	18	13.5	-3.94	.05
Total Sentences	E_4P_3	22	5.0		
	C_4P_3	18	2.5	-2.60	NS
Words Per Sentence	E_4P_3	22	8.2		
	C_4P_3	18	5.5	-3.75	.05
Abstract-Concrete Level	E_4P_3	22	3.5		
	C_4P_3	18	3.0	-3.36	.05
Abstract-Concrete Raw Score	E_4P_3	22	12.0		
	C_4P_3	18	7.0	-3.65	.05
Syntax Quotient	E_4P_3	22	89.5		
	C_4P_3	18	81.0	-2.97	.05
Ability to Discriminate Verbal Messages					
Wepman Auditory Discrimination Test					
List I	E_4P_3	22	36.0		
	C_4P_3	18	35.0	-0.9	NS
List II	E_4P_3	22	37.0		
	C_4P_3	18	37.0	-1.0	NS
Total	E_4P_3	22	73.0		
	C_4P_3	18	71.0	-1.0	NS

TABLE 9 con't

Measure	Grp.	N	Median	Z	Level of Sign.
Personal-Social Characteristics					
Self Concept					
Florida Key	E_4P_3	22	58.0		
	C_4P_3	19	46.0	-1.54	NS
Achievement Motivation					
Teachers' Ratings	E_4P_3	23	1.0		
	C_4P_3	18	0.0	-2.9	.05
Perceptual-Motor Ability					
Bender Gestalt Test	E_4P_3	23	4.0		
	C_4P_3	19	6.0	1.8	NS

A comparison of the medians on the various mathematic performance measures between the E_4P_3 and the C_4P_3 groups is presented in Table 10 . The median comparisons for mathematical functions usually taught in second grade reveal that the E_4P_3 group has more children with greater ability than the control group in subtraction, number of problems attempted, and number of problems done accurately.

TABLE 10

A Descriptive Post Second Grade Comparison between the Experimental (E_4P_3) and Control (C_4P_3) Groups on Mathematics Performance Measure

Measure	Grp.	N	YATLTLP	Median
Problems Attempted	E_4P_3	22	1	19.0
	C_4P_3	19	NA	16.0
Problems Accurate	E_4P_3	22	1	15.5
	C_4P_3	19	NA	11.0
Addition Problems	E_4P_3	22	1	10.5
	C_4P_3	19	NA	14.0
Subtraction Problems	E_4P_3	22	1	5.5
	C_4P_3	19	NA	1.0

A Post Second Grade Comparison between the E_4P_3 and C_4P_3 groups on the Rosenzweig Picture Frustration Test is presented in Table 11. (A description of this personality measure and its scoring criteria is presented in Appendix Q).

TABLE 11

A Post Second Grade Descriptive Comparison between the E_4P_3 and C_4P_3 Groups on the Rosenzweig Picture Frustration Test

Measure	Grp.	N	YATLTLP	% within norm	% Above 1 SD	% Below 1 SD
E	E_4P_3	23	1	70	22	8
	C_4P_3	20	NA	50	35	15
I	E_4P_3	23	1	57	9	34
	C_4P_3	20	NA	40	5	55
M	E_4P_3	23	1	70	13	17
	C_4P_3	20	NA	55	25	20
OD	E_4P_3	23	1	48	48	4
	C_4P_3	20	NA	55	30	15
ED	E_4P_3	23	1	87	0	13
	C_4P_3	20	NA	60	25	15
NP	E_4P_3	23	1	87	9	4
	C_4P_3	20	NA	60	10	30
GCR	E_4P_3	23	1	70	13	17
	C_4P_3	20	NA	60	15	25

On all of the seven scoring categories more of the children from the experimental group fell within the normal range of the Rosenzweig than the children from the control group.

The majority of children from both the E_4P_3 and C_4P_3 groups direct their aggression toward the environment or toward themselves when dealing with a frustrating situation. The types of reactions they use in response to frustrating situations are aimed at the causative factors involved in the frustrating situation and how the person feels about the situation he is in (i.e.; I am mad, You hurt me, I feel bad). The group conformity ratings for both groups were quite high, which is similar to the modal response to each item given by the standardization sample. Although the differences between the two groups are not large on this measure, the trend on each scoring category indicates that the E_4P_3 children are better able to cope with frustrating situations than their controls.

Table 12 represents descriptive data obtained from questionnaires sent to the parents of the E_4P_3 and C_4P_3 children at the end of second grade. It is interesting to note that more parents of experimental children returned the questionnaires than parents of the control children.

In relation to questions two, four, and six the parents of E_4P_3 children indicate that their children are doing more schoolwork at home, bringing more books home to read, and doing more arithmetic problems than do parents of the C_4P_3 children.

The E_4P_3 parents get information about their children by a variety of means (question three); making use of Parent-Teacher conferences, phone calls, PTA meetings, and work the child brings home. The parents of the C_4P_3 children rely mostly on report cards and work brought home; therefore, parental involvement with the teachers and school is at a minimum for these parents. The majority of the parents of both E_4P_3 and C_4P_3 children feel that reading is the most important subject a child should learn in school (question five).

TABLE 12

A Post Second Grade Comparison between the Experimental (E_4P_3) and Control (C_4P_3) Groups on Parental Ratings of Children's Academic Behavior

	E_4		C_4	
1. Number respondents	$\frac{15}{22}$	68%	$\frac{10}{19}$	53%
2. How often does your second grader do schoolwork at home?				
3 or more times a week	4		1	
about once a week	3		4	
2 - 3 times a week	4		1	
never	3		1	
not sure	1		3	
3. How do you get information about how your child is doing in the second grade?				
report card	12		7	
PT conference	3		5	
phone calls	4		0	
PTA meetings	7		2	
work he brings home	10		2	
4. How often does your second grader bring books home from school to read to you?				
3 or more times a week	3		0	
once a week	6		2	
2 - 3 times a month	2		2	
never	0		0	
not sure	2		5	
5. What do you feel is the most important subject a child should learn in school?				
reading	6		7	
writing	3		1	
language	2		1	
arithmetic	2		1	
science	1		0	
history	1		0	

TABLE 12con't

	E_4	C_4
6. How often does your second grader do arithmetic problems at home?		
3 or more times a week	6	1
once a week	6	2
2 - 3 times a month	2	2
never	0	1
not sure	2	3

Comparisons between the Experimental Groups (E_5P_2 vs E_4P_3) at the end of second grade (one year after termination of the Learning to Learn Program.

The medians, Z scores, and levels of significance for the comparisons between the two E groups are presented in Table 13 . The performance of the two E groups was not found to be statistically different at the end of second grade on the developmental and educational measures used in this evaluation. Thus hypothesis III is not confirmed.

TABLE 13

A Post Second Grade Comparison between the E_4P_3 and E_5P_2 Groups on Intellectual, Achievement, Linguistic, and Personal-Social Measures

Measure	Grp.	N	Median	Z	Level of Sign.
Intellectual Functioning					
General Intelligence					
SBIQ (Form L-M)	E_4P_3	23	104.0		
	E_5P_2	16	113.5	1.0	NS
Abstract Verbal Ability					
WISC VIQ	E_4P_3	23	101.0		
	E_5P_2	16	104.0	0.3	NS
School Related Intelligence					
PMA II					
Verbal Meaning	E_4P_3	23	32.0		
	E_5P_2	15	37.0	1.18	NS
Spatial Relations	E_4P_3	22	16.0		
	E_5P_2	16	14.0	-1.62	NS
Number Facility	E_4P_3	23	25.0		
	E_5P_2	15	31.0	0.6	NS
Perceptual Speed	E_4P_3	23	21.0		
	E_5P_2	15	22.0	0.78	NS

TABLE 13 con't

Measure	Grp.	N	Median	Z	Level of Sign.
School Achievement and Abilities					
Achievement					
School Grades					
Reading	E_4P_3	22	3.0		
	E_5P_2	15	2.0	2.37	NS
Language	E_4P_3	22	2.0		
	E_5P_2	15	2.0	0.4	NS
Spelling	E_4P_3	22	2.0		
	E_5P_2	15	3.0	0.8	NS
Writing	E_4P_3	22	2.0		
	E_5P_2	15	3.0	2.4	NS
Social Studies	E_4P_3	22	2.0		
	E_5P_2	15	3.0	1.4	NS
Science	E_4P_3	22	3.0		
	E_5P_2	15	3.0	0.9	NS
Math	E_4P_3	22	2.5		
	E_5P_2	15	3.0	0.4	NS
Health & Safety	E_4P_3	22	2.0		
	E_5P_2	15	2.0	1.5	NS
Physical Education	E_4P_3	22	2.0		
	E_5P_2	15	3.0	2.7	.05
Music	E_4P_3	22	2.0		
	E_5P_2	15	3.0	3.1	.05
Art	E_4P_3	22	2.0		
	E_5P_2	15	2.0	1.6	NS
Citizenship	E_4P_3	22	2.0		
	E_5P_2	15	2.0	0.3	NS
SAT II					
Word Meaning	E_4P_3	23	2.0		
	E_5P_2	15	2.1	-0.7	NS
Paragraph Meaning	E_4P_3	23	2.2		
	E_5P_2	15	2.4	0.9	NS
Science & Social Studies Concepts	E_4P_3	23	2.5		
	E_5P_2	15	2.6	0.7	NS

TABLE 13 con't

Measure	Grp.	N	Median	Z	Level of Sign.
School Achievement and Abilities					
Achievement					
SAT II					
Spelling	E_4P_3	23	2.1		
	E_5P_2	15	2.0	-0.7	NS
Word Study Skills	E_4P_3	23	2.3		
	E_5P_2	15	2.4	0.2	NS
Language	E_4P_3	23	2.3		
	E_5P_2	15	2.5	0.4	NS
Arithmetic Computation	E_4P_3	23	2.2		
	E_5P_2	15	2.6	0.9	NS
Reading Ability					
Spache Diagnostic Reading Scales					
Word Recognition Level	E_4P_3	23	3.2		
	E_5P_2	15	3.3	-0.7	NS
Instructional Level	E_4P_3	23	3.3		
	E_5P_2	15	3.3	0.1	NS
Potential Level	E_4P_3	23	3.8		
	E_5P_2	15	3.8	-0.8	NS
School Grades in Reading	E_4P_3	22	3.0		
	E_5P_2	15	2.0	2.37	NS
Arithmetic Ability					
Arithmetic subtest of the WISC	E_4P_3	23	11.0		
	E_5P_2	16	11.5	0.4	NS
School Grades in Mathematics	E_4P_3	22	2.5		
	E_5P_2	15	3.0	0.4	NS
SAT II subtests					
Arithmetic Computation	E_4P_3	23	2.2		
	E_5P_2	16	2.6	0.9	NS
Arithmetic Concepts	E_4P_3	23	2.2		
	E_5P_2	16	2.6	0.92	NS
Language Ability					
Ability to Express Ideas					
ITPA-Vocal Encoding	E_4P_3	23	21.0		
	E_5P_2	16	16.0	-3.3	.05

TABLE 13 con't

Measure	Grp.	N	Median	Z	Level of Sign.
Language Ability					
Language Comprehension					
ITPA-Auditory Vocal Assoc.	E_4P_3	23	22.0		
	E_5P_2	16	21.5	-0.3	NS
Verbal Reasoning Ability					
ITPA-Visual Decoding	E_4P_3	23	17.0		
	E_5P_2	16	14.5	-2.6	NS
Concept Formation					
ITPA-Visual-Motor Assoc.	E_4P_3	23	21.0		
	E_5P_2	16	21.0	-0.3	NS
Spoken Language Ability					
Verbal Stories					
Creativity	E_4P_3	22	5.0		
	E_5P_2	16	5.0	.02	NS
Abstraction	E_4P_3	22	5.0		
	E_5P_2	16	5.0	.37	NS
Language Quality	E_4P_3	22	5.0		
	E_5P_2	16	4.0	1.53	NS
Number of Words	E_4P_3	22	126.5		
	E_5P_2	16	87.0	-1.82	NS
Number of Sentences	E_4P_3	22	12.0		
	E_5P_2	16	8.5	-2.73	.05
Mean Length of Remark	E_4P_3	22	10.62		
	E_5P_2	16	11.07	-0.01	NS
Written Language Ability					
Written Stories					
Total Words	E_4P_3	22	34.5		
	E_5P_2	16	27.0	-1.4	NS
Total Sentences	E_4P_3	22	5.0		
	E_5P_2	16	3.5	-0.6	NS
Words Per Sentence	E_4P_3	22	8.2		
	E_5P_2	16	6.7	-0.6	NS
Abstract-Concrete Level	E_4P_3	22	3.5		
	E_5P_2	16	3.0	-1.8	NS

TABLE 13 con't

Measure	Grp.	N	Median	Z	Level of Sign.
Language Ability					
Written Language Ability					
Written Stories					
Abstract-Concrete Raw Score	E_4P_3	22	12.0		
	E_5P_2	16	7.5	-1.4	NS
Syntax Quotient	E_4P_3	22	90.0		
	E_5P_2	16	83.0	-2.5	NS
Ability to Discriminate Verbal Messages					
Wepman Auditory Discrimination Test					
List I	E_4P_3	22	36.0		
	E_5P_2	13	36.0	0.8	NS
List II	E_4P_3	22	37.0		
	E_5P_2	13	37.0	-0.1	NS
Total	E_4P_3	22	73.0		
	E_5P_2	13	72.0	0.4	NS
Personal-Social Characteristics					
Self Concept					
Florida Key	E_4P_3	22	58.0		
	E_5P_2	15	56.0	-0.46	NS
Achievement Motivation					
Teachers' Ratings	E_4P_3	23	13.0		
	E_5P_2	16	13.0	-2.87	.05
Perceptual-Motor Ability					
Bender Gestalt Test	E_4P_3	23	4.0		
	E_5P_2	16	6.0	1.11	NS

Comparisons between the Matched Treatment Control Groups (C_5P_2 vs C_4P_3) at the end of second grade (one year after termination of the Learning to Learn Program).

The medians, U statistic, and levels of significance of the comparisons between the C_5P_2 and the C_4P_3 groups are presented in Table 14. The performance of the two control groups was not found to be statistically different at the end of second grade on the developmental and educational measures used in the evaluation. Thus hypothesis IV is confirmed.

TABLE 14

A Post Second Grade Comparison between the C_5P_2 and C_4P_3 Groups on Intellectual, Achievement, Linguistic, and Personal-Social Measures

Measure	Grp.	N	Median	U_1	Level of Sign.
Intellectual Functioning					
General Intelligence					
SBIQ (Form L-M)	C_4P_3	19	82.0		
	C_5P_2	20	85.0	211.0	NS
Abstract Verbal Ability					
WISC VIQ	C_4P_3	19	89.0		
	C_5P_2	20	86.0	213.0	NS
School Related Intelligence					
PMA II					
Verbal Meaning	C_4P_3	19	27.0		
	C_5P_2	20	30.0	151.5	NS
Spatial Relations	C_4P_3	19	13.0		
	C_5P_2	20	13.0	182.5	NS
Number Facility	C_4P_3	19	12.0		
	C_5P_2	20	11.0	174.0	NS
Perceptual Speed	C_4P_3	18	17.0		
	C_5P_2	20	16.5	170.0	NS
School Achievement and Abilities					
Achievement					
School Grades					
Reading	C_4P_3	20	1.0		
	C_5P_2	19	2.0	165.5	NS
Language	C_4P_3	20	2.0		
	C_5P_2	19	1.0	201.0	NS
Spelling	C_4P_3	20	1.0		
	C_5P_2	19	2.0	128.5	NS
Writing	C_4P_3	20	2.0		
	C_5P_2	19	2.0	185.0	NS
Social Studies	C_4P_3	20	2.5		
	C_5P_2	19	2.0	215.5	NS
Science	C_4P_3	20	2.5		
	C_5P_2	19	2.0	218.0	NS
Math	C_4P_3	20	2.0		
	C_5P_2	19	2.0	159.5	NS

TABLE 14 con't

Measure	Grp.	N	Median	U_1	Level of Sign.
School Achievement and Abilities					
Achievement					
School Grades					
Health & Safety	C_4P_3	20	2.0		
	C_5P_2	19	3.0	157.0	NS
Physical Education	C_4P_3	20	2.5		
	C_5P_2	19	3.0	160.5	NS
Music	C_4P_3	20	3.0		
	C_5P_2	19	3.0	170.0	NS
Art	C_4P_3	20	3.0		
	C_5P_2	19	3.0	170.0	NS
Citizenship	C_4P_3	20	2.0		
	C_5P_2	19	2.0	188.0	NS
SAT II					
Word Meaning	C_4P_3	17	1.6		
	C_5P_2	19	1.8	118.5	NS
Paragraph Meaning	C_4P_3	17	1.7		
	C_5P_2	19	1.7	104.5	NS
Science & Social Studies Concepts	C_4P_3	17	1.6		
	C_5P_2	19	1.8	182.5	NS
Spelling	C_4P_3	17	1.7		
	C_5P_2	19	1.5	111.5	NS
Word Study Skills	C_4P_3	17	1.7		
	C_5P_2	19	1.7	134.5	NS
Language	C_4P_3	17	2.1		
	C_5P_2	19	2.3	106.0	NS
Arithmetic Computation	C_4P_3	17	1.6		
	C_5P_2	19	1.8	154.5	NS
Arithmetic Concepts	C_4P_3	17	1.7		
	C_5P_2	19	1.6	161.5	NS
Reading Ability					
Spache Diagnostic Reading Scales					
Word Recognition Level	C_4P_3	19	1.8		
	C_5P_2	20	1.8	195.5	NS
Instructional Level	C_4P_3	19	1.6		
	C_5P_2	20	1.6	207.0	NS

TABLE 14 con't

Measure	Grp.	N	Median	U_1	Level of Sign.
School Achievement and Abilities					
Reading Ability					
Spache Diagnostic Reading Scales					
Potential Level	C_4P_3	19	3.3		
	C_5P_2	20	2.8	202.5	NS
School Grades in Reading	C_4P_3	20	1.0		
	C_5P_2	19	2.0	165.5	NS
Arithmetic Ability					
Arithmetic subtest of the WISC	C_4P_3	19	8.0		
	C_5P_2	20	8.5	161.0	NS
School Grades in Mathematics	C_4P_3	20	2.0		
	C_5P_2	19	2.0	159.5	NS
SAT II subtests					
Arithmetic Computation	C_4P_3	17	1.6		
	C_5P_2	19	1.8	154.5	NS
Arithmetic Concepts	C_4P_3	17	1.7		
	C_5P_2	19	1.6	161.5	NS
Language Ability					
Ability to Express Ideas					
ITPA-Vocal Encoding	C_4P_3	19	14.0		
	C_5P_2	20	15.5	178.5	NS
Language Comprehension					
ITPA-Auditory Vocal Assoc.	C_4P_3	19	18.0		
	C_5P_2	20	19.0	205.0	NS
Verbal Reasoning Ability					
ITPA-Visual Decoding	C_4P_3	19	15.0		
	C_5P_2	20	16.0	165.5	NS
Concept Formation					
ITPA-Visual-Motor Assoc.	C_4P_3	19	18.0		
	C_5P_2	20	18.0	186.0	NS
Spoken Language Ability					
Verbal Stories					
Creativity	C_4P_3	17	4.0		
	C_5P_2	20	3.0	230.5	NS
Abstraction	C_4P_3	17	4.0		
	C_5P_2	20	4.0	176.5	NS
Language Quality	C_4P_3	17	4.0		
	C_5P_2	20	3.0	199.5	NS

TABLE 14 con't

Measure	Grp.	N	Median	U_1	Level of Sign.
Language Ability					
Spoken Language Ability					
Verbal Stories					
Number of Words	C_4P_3	17	71.0		
	C_5P_2	20	54.5	212.5	NS
Number of Sentences	C_4P_3	18	10.0		
	C_5P_2	20	7.0	239.0	NS
Mean Length of Remark	C_4P_3	18	8.41		
	C_5P_2	20	6.84	239.0	NS
Written Language Ability					
Written Stories					
Total Words	C_4P_3	20	11.5		
	C_5P_2	20	24.0	210.0	NS
Total Sentences	C_4P_3	20	1.5		
	C_5P_2	20	1.0	196.0	NS
Words Per Sentence	C_4P_3	20	5.2		
	C_5P_2	20	5.4	222.5	NS
Abstract-Concrete Level	C_4P_3	20	2.5		
	C_5P_2	20	1.0	255.5	NS
Abstract-Concrete Raw Score	C_4P_3	20	4.0		
	C_5P_2	20	0.5	242.5	NS
Syntax Quotient	C_4P_3	20	80.0		
	C_5P_2	20	94.0	213.0	NS
Ability to Discriminate Verbal Messages					
Wepman Auditory Discrimination Test					
List I	C_4P_3	17	34.5		
	C_5P_2	19	31.0	210.0	NS
List II	C_4P_3	17	37.0		
	C_5P_2	19	33.0	222.5	NS
Total	C_4P_3	17	71.0		
	C_5P_2	19	64.0	219.0	NS
Personal-Social Characteristics					
Self Concept					
Florida Key	C_4P_3	19	46.0		
	C_5P_2	20	52.5	169.5	NS

TABLE 14 con't

Measure	Grp.	N	Median	U_1	Level of Sign.
Personal-Social Characteristics					
Achievement Motivation					
Teachers' Ratings	C_4P_3	16	9.5		
	C_5P_2	19	12.0	127.5	NS
Perceptual-Motor Ability					
Bender Gestalt Test	C_4P_3	19	6.0		
	C_5P_2	20	7.5	139.5	NS

Longitudinal Developmental Patterns of Relatively Bright and Relatively Dull Children

In order to determine what, if any, differences three years as opposed to two years of the program made for relatively bright children and relatively dull children the E and C groups were divided into subgroups based on whether they were "average" (90 IQ $>$) or "below average" ($<$89 IQ) in intelligence when the program began. Descriptive comparisons were performed to investigate the developmental growth patterns of children who were at different IQ levels when they began the program. In other words, we wanted to determine what differential long term effects exposure to the experimental and control programs had on children who were relatively bright or relatively dull.

These data for both the E and C groups are presented in Table 15.

Traditional educational programs did not help the control children gain or catch up in their educational or developmental skills. This is especially apparent when considering that approximately 60 percent of the control children who were relatively bright at four- and five-years of age are experiencing educational and developmental difficulty at the end of second grade. Control children classified as relatively dull at ages four and five have not caught up developmentally or educationally either. Only about 15 percent are performing adequately at the end of second grade.

In contrast, the gains for the E children are substantial. Of the children who participated in the Learning to Learn Program approximately 88 percent of those who started the Program in the average range of intelligence are achieving quite well at the end of second grade. The E children who participated in the Learning to Learn Program for three consecutive years (E_4P_3) are slightly superior to the E children who participated in the Learning to Learn Program for two consecutive years.

Differences between the two experimental groups (two years vs three years in the program) appear when comparing the children who started the program with IQ's below 89. A greater percentage of these relatively slow E children who participated in the Learning to Learn Program for three consecutive years (E_4P_3) are achieving at or above grade level than the comparable E children who participated in the program for two consecutive years (E_5P_2). Three consecutive years as opposed to two consecutive years of the Learning to Learn Program benefits approximately 30 - 35 percent more children who can be classified as educationally high-risk.

The authors, however, feel due to the small N of the $E_5P_2 < 89$ IQ subgroup these results need to be interpreted cautiously. At this point we feel our data suggest that it is educationally better to begin a program for high-risk children at four rather than at five. We hope in a later study to see if this same finding holds up in other pre-school programs for educationally high-risk children.

TABLE 15

Experimental and Control Subgroup Comparisons based on Pre-Program Stanford Binet IQ (IQ 90 or >, IQ 89 or <) and Number of Years of the Experimental Groups in the Learning to Learn Program

	Pre-Program IQ 90 or >				Pre-Program IQ 89 or			
	Post Second Grade							
Groups	E_4P_3	E_5P_2	C_4P_3	C_5P_2	E_4P_3	E_5P_2	C_4P_3	C_5P_2
N	7	10	8	10	15	6	10	11
Measures								
Intelligence	-% within or above average range of intelligence							
Stanford Binet	100	100	37	50	80	50	11	10
WISC-VIQ	100	100	37	60	87	67	27	20
PMA-DIQ Group Measure	100	90	0	30	47	33	10	10
Reading	-% at or above grade level							
Spache Diagnostic Reading Scale	100	100	38	40	56	50	25	0
	-% of A and B reading grades							
School Reading Grades	75	30	13	20	53	17	27	0
Achievement	-% of A, B, and C grades							
School Grades in Academic Subjects	100	97	71	72	94	87	56	52
	-% of children within or above 6 mths. of grade level							
Achievement Test	80	80	25	53	44	42	24	18
Mathematics	-% of children greater than scale score 9							
Arithmetic subtest of WISC	100	100	63	70	87	50	20	30
	-% of children within or above 6 mths. of grade level							
Mathematics Achievement Test Results	75	100	14	40	53	17	20	20

TABLE 15 con't

	Pre-Program IQ 90 or >				Pre-Program IQ 89 or <			
	Post Second Grade							
Groups N	E_4P_3 7	E_5P_2 10	C_4P_3 8	C_5P_2 10	E_4P_3 15	E_5P_2 6	C_4P_3 10	C_5P_2 11
Measures								
Language								
	-% of children above CA in terms of LA							
ITPA-AVA	88	78	0	0	47	0	18	0
ITPA-VE	57	10	25	10	47	17	0	0
	-% of children above age appropriate norms							
Words per Sentence	88	44	0	0	66	60	18	10
Perceptual Motor								
	-% of children above age appropriate norms							
Bender Gestalt	63	22	38	22	47	40	27	11

CHAPTER VIII

Discussion and Conclusions

Discussion

Evidence derived from this evaluation study strongly supports the theory that early childhood education is important and advantageous to the overall development of young children, and that it is particularly important for children from poverty backgrounds.

It indicates that the Learning to Learn Program successfully provides for the broad range of developmental needs of early childhood as well as for the specific abilities and skills that insure educational competencies through the primary grades. The research results clearly document that at the end of second grade, black poverty children who participated in the experimental preschool and first grade program were more advanced in their cognitive, educational, and personal-social functioning than children with the same socio-economic background who attended traditional early childhood education programs.

Progress in learning, school achievement, and personal-social development in the primary grades of public school has been consistent and positive for participants from the Learning to Learn Program, but haphazard or even nonexistent for black poverty children from traditional preschool backgrounds, thus indicating that the specific type of early childhood education experience directly and differentially influences children's educational competencies in public school settings.

The Learning to Learn Program has effectively developed, implemented, and personalized early childhood education based on individual children's ability levels and their instructional needs, thus indicating that a well organized, sequential early childhood education program based on the Learning to Learn approach, conscientiously implemented, achieves greater developmental and educational gains than one without this orientation and emphasis.

The social and economic impact of the preceding statement becomes apparent when one considers that in the coming decade, federal and state governments will in all probability be subject to increasing and widespread pressures to provide special educational services to very young children and their parents. Already there has been a large increase in the number of three-, four-, and five-year-olds enrolled in nursery school and kindergarten in the United States. According to the United States Census Bureau one in ten children of these ages was enrolled in some kind of formal preschool program in 1965; in 1970 the figure was one in five. About two-thirds of this increased enrollment is accounted for by federal child care programs begun since 1965. There are more than 11.6 million mothers with jobs today. More than four million of them have children under six. An estimated 8 out of 10 working mothers who have preschool age children are not eligible for the majority of federal or state supported early childhood programs. At the present time there are only 640,000 licensed daycare spaces available, and about one-third of these are privately run. The Labor Department predicts that by 1980, 5.3 million mothers with small children will be working. Passow (1970) states the downward extension of schooling seems assured in the years ahead. What is now considered preschool will become a basic component of America's common school. Having recognized the crucial importance of the formative childhood years on intellectual, personal, linguistic, and social growth, educators and laymen are beginning to program instruction to constitute a sound foundation for all children whatever their origins. The experiences and environment of the early years are critical for continued learning. To be most effective early childhood education programs will provide experiences, activities, and materials specifically designed for cognitive, intellectual, linguistic, social, and motivational growth of young children. Their curriculum will apply the findings of continuing diagnosis and evaluation of each child's developmental progress and will be highly individualized. While many elements of today's nurserys and kindergarten programs will be apparent, far more attention will be given to exposing young children to a comprehensive, sequential learning environment.

The Learning to Learn Program is a comprehensive, sequential early childhood educational program which in its goals for children incorporates the above as well as a sequential curricular developmental approach geared to individual competencies, needs and development of children based on Piaget's developmental theory. In educational competency areas of the Learning to Learn Program instruction is direct, specific, yet still informal with a core of language development and interpersonal interaction between children and teacher. In its broadest dimension the curriculum for young children is aimed at cognitive growth, concept formations, abstract reasoning, values, and perceptual refinement within a framework of key concepts from basic subject discipline. Children become able and are helped to think about experiences and to interpret the world around them. The curriculum helps the child understand and process concepts, attitudes, values, and feelings that are related to him.

There is significant agreement among educators, psychologists and those concerned with young children and their total development that custodial care is not enough, and that the first six years of life are of crucial importance to children's intellectual, educational, and personal-social development. These are the years when children's ways of thinking and behaving are being formed, which is the basis for their future mental and educational development.

Professional workers in early childhood intervention programs are generally enthusiastic about their achievement with poverty children, but there has been very little hard evidence by which to evaluate their claims. Except for a few preschool studies, which consistently revealed a pronounced early spurt in intellectual, and language development, no clear cut evidence has emerged that any previous intervention program have made a substantial long term educational impact on the educationally high-risk children involved (SRI, 1971). Wilkerson (1970) states that it appears the gains in child development resulting from early intervention are quickly lost when the youngster enters regular kindergarten and first grade classes in public schools. Of the eight longitudinal early childhood education intervention programs studied and reported by the Stanford Research Institute in 1971, only the Learning to Learn Program has indicated significant differences and above average gains when comparing long term impact of the early childhood programs in relation to children's intelligence, school achievement and other developmental areas.

The Learning to Learn Program appears to have provided young children with what they need to know in order to get the most out of being four- or five-years of age (Van De Riet, Van De Riet, 1969; Van De Riet, Resnick, 1970, 1972). This approach to early childhood education has also prepared the child for first grade, and has provided these children with the educational strategies that can be built upon for future educational success.

It seems to be a reasonable hypothesis that to the extent that an educational program for young children contributes to their success as students and citizens, it will significantly reduce the necessity for subsequent remedial work, counseling, and even penal and welfare costs for society. There are no definitive statistics on how much the federal or state governments might save in the long run by investing in early childhood education intervention programs. It is clear though that a relationship exists between failure in the initial years of formal education and the high percentage of drop outs in the public schools. The 1967-68 financial study prepared by Moody Investor Associates for the State of South Carolina linked implementations of the state's kindergarten program to the state's total manpower resources in the overall drive for economic growth. The report estimated that the effect of preschool and kindergarten programs would be to reduce the number of first grade repeaters and rsults in a savings of at least 2.5 million dollars a year. Over a long period of time there will be cost savings in the form of reduced expenditures for special and remedial education, reduce rates of delinquency and crime, and an increase in the general productivity of society. (Rampton, 1971)

The recent national interest in educational programs for poverty children has focused attention on the curriculum and school settings that will meet the specific needs of these children. Until recently little was known about the specific needs of poverty children and the education that would best serve their needs. Early efforts to provide educational intervention were usually directed toward providing what has been considered "good" nursery school experience. Education for any group of young children, however, should be soundly based on the accumulated knowledge of the child's early learning development. There is an especially urgent need to identify the capabilities of poverty high-risk children or specifies the educational content, setting, and curriculum that will adequately serve them.

The Learning to Learn Program has developed and demonstrated an approach to early childhood learning that fosters positive long term social-emotional growth and sound linguistic, intellectual, and educational development in poverty children. Our evaluation and research data indicate that at least on a demonstration basis the program can bring these children to a point where they are functioning adequately when using the mean of our culture as a norm. These children who in early childhood were educationally high-risk are now achieving competently in public school. The authors do not claim that the Learning to Learn Program is the only way to achieve educational success with poverty children, however, this research evaluation makes it apparent that this is a very effective approach.

Our evaluation study does not attempt to indicate which specific components of the Learning to Learn Program account for the educational competencies exhibited by the experimental children in public school. However, we hypothesize that the success of the Learning to Learn Program is in its innovation in the utilization and integration of the following educational components which when properly combined yield a comprehensive approach to early childhood education.

1. Child behavior: educational experiences are individualized and based on the child's ability level and his developmental needs.

2. Teacher behavior: the teacher is cast in a role of an educational facilitator and responsible for children's learning.

3. Classroom arrangements: the Learning to Learn Program utilizes two distinctly different classroom arrangements as an educational environment. One is the large classroom which is child centered where children work, play, explore, and experiment with a wide range of materials and playmates. The second educational setting is a classroom or partitioned area where only a small group of two, three, or four children work with the Learning to Learn materials pre-selected by the teacher.

4. Curriculum: the Learning to Learn Program has developed and organized a sequential and continuing curriculum from nursery school to first grade, which exposes children to learning tasks appropriate to their level.

5. Parent education: the Learning to Learn Program enlists the cooperation of parents to supplement the school program with a home program. Parents participate in monthly instructional sessions in which the primary purposes are to point out to parents that they are a vital link to their children's educational development.

In summary, only by integrating the important variable that bear directly on early childhood education (the child, teachers, parents, classroom arrangements, and curricular materials) has the Learning to Learn Program become effective in developing educated children.

Conclusions

There is evidence from this longitudinal evaluation study to support the following conclusions:

1. The Learning to Learn Program has successfully developed and demonstrated the effectiveness of an early childhood education program for black poverty children which is based on a sequential curriculum and comprehensive methodological approach.

2. The experimental program has had a significant, positive, and long term effect on the intellectual, educational, and affective development of its participants.

3. The Learning to Learn Program has prepared its participants for academic success in public school. These children are now performing at an average or above average level in reading, arithmetic, and communication skills. This is not true for the control groups.

4. The Learning to Learn Program has enhanced the personal-social development of the children who participated in it. In public school they are perceived as children with high achievement motivation, positive self concepts, and an appropriate level of school citizenship. This is not true for the control groups.

5. The Learning to Learn Program has prepared its participants for achievement in public school commensurate with their potential. Their controls are underachievers in relationship to their potential.

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APPENDIX A

The Learning to Learn Kindergarten Curriculum

In order to more vividly present the sequential nature of the curriculum an outline of the curriculum for the five-year-old program is presented. (The following is a content summary of the programs described in Inquisitive Games, Exploring Numbers and Space, Sprigle, 1967, and Inquisitive Games, Language and Communication, Sprigle, 1969, published by Science Research Associates).

Inquisitive Games, Language and Communication:

I. Learn ways to gather, relate, organize and apply information so that the information becomes meaningful and useful. This involves the use of senses to gather information.

A. Visual
1. Observation of and attention to shape, color and distinguishing characteristics to identify items.

2. Observation of and attention to similarities and differences of shape, color and distinguishing characteristics to differentiate between items.

3. Observation of and attention to shape, color and distinguishing characteristics to identify identical items.

4. Observation of and attention to shape, color and distinguishing characteristics to locate and identify items in an array.

5. Observation of and attention to parts and position of parts of an item to form a whole item.

6. Identification of item by observation and attention to partial visual clues (shape without color, partial shape with color, partial shape without color).

B. Auditory
1. Listening to and concentrating on verbal description to identify items.

2. Associating verbal description with visual model to identify items.

3. Listening to and concentrating on stories to find facts.

4. Listening to and concentrating on stories to anticipate outcome.

5. Listening to and concentrating on verbal directions to understand nature of a problem and how to complete a task.

6. Listening to and concentrating on words to discriminate between sounds.

C. Organization
   1. Labeling
      (a) Learn to associate name with item having specific attributes (shape, color).
      (b) Learn to associate name with picture of item.
      (c) Learn to associate name with picture of item when some visual clues have been removed (shape without color, partial shape with color, partial shape without color).
      (d) Learn names of categories
      (e) Learn to associate groups of items with category name.

D. Classification
   1. Learn that items can be arranged into categories by some type of system.

   2. Given the information, learn names of categories and items belonging to each category.

   3. Given criteria of how items are categorized and description of how items meet criteria separate items into categories.

   4. Recall information to separate array of items into 2, 3, 4, or 5 categories.

   5. Combine sub-categories into general categories using criteria of attributes and/o[illegible]nction.

E. Part-Whole
   1. Associate attributes of parts to whole items.

   2. Arrange parts to form whole.

   3. Breakdown whole into parts.

F. Sequence
   1. Anticipate and describe events of a story from a storybook.

   2. From a story sequence of 2 pictures, choose an appropriate ending from a choice of 2 pictures.

   3. From a story sequence of 3 pictures, choose an appropriate ending of story from a choice of 2 pictures.

4. From an array of 7 or 8 pictures, choose any number of pictures to make a story.

G. Problem Solving
  1. Past learning to make decisions
    (a) Apply information to separate items into categories
    (b) Given all parts, identify whole
    (c) Given partial visual clues, identify item (shape without color, partial shape with color, partial shape without color)
    (d) Make visual representation of item or items
    (e) Using knowledge of story structure, sequence pictures and make up a story about them
    (f) Make a series of decisions to complete a task.

  2. Hunches and guesses to make decision
    (a) Identify item from incomplete clues
    (b) Associate known items with unfamiliar items for general identification of category.

II. Experience satisfaction of possessing knowledge and being able to use it for independent accomplishment.

A. Problem solving (see above)

  1. Use past learning to make decisions.

  2. Use hunches and guesses to make decisions.

B. Anticipate events and circumstances.

  1. Apply knowledge of game procedure to new game.

  2. Anticipate other children's play during a game to block their play.

  3. Anticipate own next play and structure play for advantage.

  4. Anticipate and describe events of a story.

III. Learn to communicate knowledge and ideas verbally.

A. Description

  1. Apply name to item.

  2. Apply name to category.

  3. Apply learned descriptive vocabulary to describe items.

4. Tell uses to describe item.
5. Compare and contrast attributes of items.

B. Discussion

1. Associate own experience to items and relate experiences to group.
2. Apply knowledge to tell reasons for guesses and decisions.
3. Answer questions.

C. Story Telling

1. Describe elements of pictures containing action.
2. Express ideas concerning action of a picture.
3. Use sentences rather than 1 or 2 words to express ideas.
4. Relate action in a sequenced series of pictures to make a story.
5. Elaborate on action of a picture giving events before and after, describing emotions of characters, giving dialogue to characters.
6. Elaborate on action of sequenced pictures giving story details.
7. Choosing a series of pictures, sequencing theme, and telling a story about them.

APPENDIX B

Description of the Multi-Modality Curriculum

Orientation of the Learning to Learn Program

Motor Phase

Walking Board - Similar to railroad rail.
Objective: To develop balance, laterality (internal right and left sides of body), directionality.

Just getting to other side is not the goal. Child is shown how to walk forward, backward, sidewise, etc.

Stepping Stones - Six inch squares of cardboard or tile, ten of one color, ten of another, placed in a pattern around the room. Left foot steps on one color, right foot on the second.

Objective: To develop eye-foot coordination as well as laterality and directionality.

Balancing Board - Square platform and underneath in the middle is a balance post.

Objective: To develop balance and motor coordination.

Trampoline - Spring and mattress tied together.

Objective: To develop coordination, muscular control and body image.

Obstacle Course - Two chairs and yardstick.

Objective: To develop balance, coordination and spatial judgement.

Spatial Estimation Game - Circular and square openings to go through; sticks to step over or go under. Child must judge which of 2 choices he can master.

Objective: To develop body image and the relationship of child's body to another object.

Obstacle Course Exercises - Sequence of walking board, balance board, stepping stones, trampoline, obstacle course. Children follow each other through the sequence. Individual performance is stressed, not competition.

Objective: Balance, coordination of eye and foot, muscular control and body image. Also, to measure the degree of control under distracting conditions.

Space Localization Game - Blocks placed at varying distances. Child must decide which of two colored blocks he can reach while sitting at a chair.

Objective: To develop an understanding of spatial relationships and spatial directions and to develop kinesthetic clues to aid in estimation.

Space Localization Game 2

Objective: To further develop an understanding of spatial relationship and spatial directions, and kinesthetic clues to aid in spatial estimation.

Space Structure - Same material as Space Localization 2.

Objective: To develop judgements about spatial relationships when the two objects to be judged are at points removed from the child.

Space Structure 2

Objective: To develop judgements about spatial relationships when the two objects to be judged are at points removed from the child. Game will also measure degree of transfer from previous game. Just as important is developing attention and concentration and decision making where the outcome is uncertain.

Activity Record Exercise - Series of activities, walking, running, crawling, hopping, etc.

Objective: To reinforce what has been learned previously and determine the degree of transfer. Also, child is required to pay attention and follow directions.

Free Scribbling - Chalkboard or other medium like finger paints or newsprint and heavy crayons. Record is used to increase motivation, rhythm, and freedom of movement.

Objective: To experiment with basic movement patterns of the body.

Circular Movement - Same medium.

Objective: To promote free, gross movements with arm and shoulders. Also, to develop motor control and following directions when teacher instructs to change directions.

Circles - Templates and progressing to copying and reproducing from memory.

Objectives: Development of tactile and kinesthetic clues of circular movement and its control.

Circles - Templates of varying sizes.

Objective: Same as above. Also development of size concept, location.

Lazy Eight - Template

Objective: Same as circle. Progressing from templates to free movements, to tracing, copying, then memory.

Plus Sign - Same sequence as Circle.

Plus Sign - Variation in size, location, concept, largest, smallest. Same sequence as Circle.

Concept Same - Circle templates, large, medium, small.

Objective: Tactile, kinesthetic, visual comparison of size.

Construction of Squares - Template

Objective: Starting and stopping of movements and changing directions.

Squares - Templates of varying sizes.

Objective: Same as circle.

Concept of Same - with Square

Objective: Same as above - tactile, kinesthetic, visual comparison of sizes.

Construction of Triangle

Same procedure and sequence as Circle and Square.

Thinking in Color Series - Colored sticks of varying lengths.

Objective: Experiences to provide a foundation on which children can successfully build and develop thinking and reasoning ability and mathematical skills and concepts.

Period of Play and Observations - Properties of the sticks; general observation of equivalence. Arrangement of sticks by color and size. Introduction of tall, short, tallest, shortest.

Steps in Color - Continuation of concepts, tallest, shortest, by making steps.

Color Combinations Games - Child is to find the two colors that will make the color which the teacher gives him.

Objective: To develop scanning and exploration to solve a problem. Also, to observe the additive concept of length.

Part 2 - Color Combination Game - Same as above but must make two different combinations by reversing the colors.

Objective: Experience with commutative property.

Constructive Form - Construction of sequence of some color, then triangles.

Constructive Form 2 - Using color squares as a model, build the same size square using the combination of colors that make up that one color.

Constructive Form 3 - Same as 2 but building a triangle with color combinations.

Thinking in Color - Early experiences in relationships and conservation of mass. Colored construction clay.

Objective: To make observations about invariance of quantities; that the whole remains, whatever may be the arrangement of its parts and the change of its form.

Non-directive Play - To get the child acquainted with the colored construction clay.

Balls in Color - Observation of equivalence. Arrangement of clay by color and size. Observation of largest, smallest, middle size.

Hot Dogs and Candy - Observation of changes in form and size.

Hot Dogs and Candy 2 - Additional observation of changes in form and size to measure the extent of transfer of learning.

Thinking in Color - Early Experience in Relationships and Conservation of Volume. - Procedure similar to that used with conservation of mass.

Motor Clues - Child imitates an activity (like hammering) and other children attempt to guess what he is doing.

Objective: To facilitate the development of mental imagery and verbal expression.

Perceptual Phase

Self Awareness Activities - Viewing self in mirror and performing activities suggested by teacher.

Identification - To place the parts of the body to make a boy.

Objective: To give the child experiences with parts of the body. It also requires that the child make discriminations and in so doing confronts him with the fact that things have a place and belong together. Encouragement of any verbalization that might arise.

Draw a Boy and Girl - Further experience with body parts. To be first entry in scrapbook.

Association - To place clothes on appropriate person and appropriate part of body.

Objective: To acquaint the child with common objects as well as associating clothes with parts of the body. To stimulate and encourage verbalization and sharing of common experiences.

Search for Clothes - To find and identify boys' and girls' clothes and place them appropriately in scrapbook. Use popular magazines, Sears catalog.

Classification - To place the furniture in the appropriate rooms.

Objective: To organize and classify. To stimulate and encourage verbalization and discussion.

Search for Furniture - To find and identify furniture and place them appropriately in the scrapbook.

Stories and pictures of fruits, vegetables, meats - Teacher describes, tells about and shows where they grow and how or where they come from.

Category - Identifies and places objects in appropriate place. Fruits, vegetables, meats.

Objective: To organize and classify; to stimulate and encourage verbalization and discussion.

Search for Fruits, Vegetables, Meats - To find, identify and place appropriately in scrapbook.

Spatial Judgement - Visual - Motor - Temporal - Child walks to two objects spaced different distances apart. Each object associated with a color. He is to pick the color that is closer or farther away.

Objective: To develop judgements about spatial relationships as they are related to child's own body. Also, to stimulate conversation as child must say why he made the particular choice.

Sounds of the Farm - Auditory-visual association. Record with sounds of farm animals and teacher holds up picture of that animal.

Animals - Classifies farm or zoo animals as he wins them on his turn with the spinner.

Objectives: Reasoning by association and to stimulate and encourage verbal expression.

Sounds of the City - Auditory-visual association. Record with sounds of city and teacher holds up picture of object making that sound.

Transport - Classifies what carries people where they want to go and what carries things people need as he wins them with his turn on the spinner.

Mental Recognition - Blindfolded, the child identifies part of the body.

Objective: To develop a mental representation in the absence of visual clues and to verbalize tactile impression.

Haptic Perception - Blindfolded, the child identifies body parts by tactile impressions and places it on the body.

Objectives: To determine if child has a well developed image of the body. Also requires close attention and concentration. Transfer of learning.

Perceptual awareness and discriminations are developed.

Activity - Furniture - Child identifies the piece of furniture held up by the teacher, reports its location in the house and its function.

Objective: To use the knowledge acquired from previous experiences in developing symbolic representations and being able to verbalize them.

Perceptual awareness and discriminations are developed.

Tactile - Visual Recognition - Child uses prior knowledge to select from among several choices the object hidden from view which he must identify by tactile impression. Real fruit and vegetables are used.

Objective: To give the child experience at processing information needed to solve a problem. Child must get a mental image from the tactile impressions and successfully put together various clues. Stimulation of verbal expression.

Tactile - Visual Closure - Builds upon previous game. This time child must select from pictures rather than real object.

Objective: To gradually remove the perceptual vividness and bring to a symbolic, verbal level.

Absurd - Child makes use of past information to place objects together that go together.

Objective: To measure the degree of understanding of previous experiences. The game requires associating ideas, reasoning, and generalizing from previous experiences.

At this point the child uses his understanding of the perceptual properties of the sticks to think and solve problems.

Commute Game - To see which of two opposing teams of two children each can complete a square using the five colored sticks.

Objective: To measure the degree of understanding of the relationships of the sticks and the commutative property.

Additive Game - To build a house with the colored sticks which are obtained by rolling dice and interpreting the sign.

Objective: To give child experience at processing information he needs to solve a challenging problem. It also measures the degree of understanding of the relationship of the sticks and the commutative property.

Equivalence - To find the combination of colored sticks that will be equivalent to a plain unmatched stick.

Objective: To develop and master the notion of equivalence.

Estimation - To reproduce a length that is visually present but gives no clues. The child must decide what combination of lengths are equivalent to the one presented.

Objective: Measures extent to which child can transfer previous learning to new situation. Also develops spatial judgements.

Steps - To build an ordered set of sticks using the various combinations.

Objective: To measure the degree of understanding of relationships of colors and degree of transfer of learning. The game requires that the child attend closely and concentrate in order to build an ordered set.

Reversible - To find out which of three balls made the hot dog.

Objective: To give the child experience in making critical judgements about an object when its form has been changed. It also gives the teacher some idea of the extent to which the child generalized from previous activities.

With an understanding of the colored sticks, their properties and the operations that can be performed with them, the child is now ready to move into numbers. This will follow the previous pattern of exposing the child to a planned sequence of numerals. Children will be given concrete experiences that demonstrate how numerals represent something, and how they convey a meaning.

One to One - Child associates pebble and numeral with animal which he wins by rolling the dice.

Objective: To help the child develop a solid understanding of numbers by giving him concrete experiences with numerals and the objects they represent.

Sets of Elements - Child rolls the dice and finds the number of objects on his card that corresponds to the numeral. Numerals and objects from one to five.

Objective: To reinforce the understanding of the numerals learned in the previous game.

Sets of Elements 2 - Continuation of previous game. Objects and numerals six to nine.

Inclusion - Child attempts to get as many animals of one kind as possible by the wise choice of alternatives.

Objective: To give the child early experiences with decision making, probability, relational concepts and multiple class membership.

Interest - To see which circle can be filled with girls and boys, keeping track of how many is in each circle and how many children are in both circles. Children can be added or taken away, depending on show of dice.

Objective: To strengthen the concept of numbers, how they express a value and aid in keeping records. Also to develop concept of class and class membership.

Base Two - To replace two red sticks with a purple one until he has made five purple sticks.

Objectives: To get the child familiar with numerals and a base system.

Base Three - To replace three red sticks with a green one until he has made five green sticks.

Base Four - To replace four red sticks with a brown one until he has made five brown sticks.

Base Five - To replace five red sticks with an orange one until he has made five orange sticks.

Extension - To make a brown stick from two purple and four red sticks.

Using objects with which the child is quite familiar, the next series of games and activities attempt to bring the child from the stage of dependence on vivid perceptual features of an object to the stage where he can identify an object on the basis of a few clues. This can be accomplished with the development of perceptual imagery.

Part - Whole - Objects previously used are presented at progressively increasing levels of completeness.

Objective: To help release the child from need for redundancy of details and be able to construct whole from details. Also, to gain experience at hypothesis making and testing.

Perception - To complete pictures by identifying the other part that is needed to make the whole.

Objective: To develop greater economy of perception by having the child reconstruct objects from fragments. Attention, concentration, and ability to scan are also demanded to play the game successfully.

Closure - Game is played similar to Scrabble. The child matches up the parts to make a whole animal.

Integration - Game is played exactly like Closure, only this time there are three instead of two pieces.

Symbolic Phase

Encourage and stimulate verbal expression about this on previous experience. Group interaction.

Sounds of the Farm - Auditory - Verbal. Child hears only the sound and must tell the name of the animal making that sound.

Sounds of the City - Auditory - Verbal. Child hears only the sound and must tell the name of object making the sound.

Transpose - Match the objects teacher holds up with those on his card. Must report the category of the objects. Encouraged to say names to himself as he scans his card.

Objective: To measure the degree of learning of past experiences and bring experiences to verbal level. Also demands attention and concentration as the objects are transformed. Internalized conversation.

Order - To reproduce on a horizontal line, what has been briefly exposed on a vertical line and to report its classification.

Objective: Child must pay close attention to the order of the objects as well as their number. He must commit these to memory and hold them in mind while he scans a board of pictures, all of which are potential distractors. He must select the appropriate picture and mentally transform their position to a horizontal line. Internalized conversation.

From this point the games and activities place a heavy emphasis on verbal and creative expression. The child is called upon to put into words all the previous experience he has had with the objects and materials. The shift is from showing to relating in a meaningful way. What he relates and the materials he uses will reflect the degree of learning and understanding that has taken place up to this time.

Precise - Replace an inappropriate picture with one that accurately identifies the function.

Objective: To develop precision in language usage in his quest to master it. Also, to determine the amount of learning about parts of the body and their function.

Rhymes - The child finds an object that rhymes with the teacher's word, says its name and places it with similar objects (house, food, animal, etc.)

Objective: Auditory discrimination. Also, to measure the degree to which child can classify and generalize.

Distortions - Telling a story with pictures in a non-sensical way and having the child correct the incongruity.

Objectives: To develop an understanding of how things are related and to access the extent of transfer of learning.

Choice - The child is to find the multiple choice picture that finishes the story and then tell a story about it.

Objective: To give the child an opportunity and experience in seeing cause and effect relationships and successfully interpret his environment. Also, to give the child experience in verbal expression and fluency. Still another important goal is to help the child delay and think before going into action.

Changing Name Game - Child explains why you cannot arbitrarily change the names of objects.

Objective: To develop verbal expression and fluency to get the child thinking in terms of likenesses and differences and the building of auditory associations.

Feelings - The child is to find the multiple choice picture that finishes the story according to the mood he chooses the person to have. Child then tells the story.

Objectives: To give the child experiences with recognizing and coping with feelings. It also helps develop verbal expression and fluency.

Insight - Child builds a story with pictures, then people depicting various feelings.

Objective: To help develop creative use of language. Also, to give the child an opportunity to talk about their feelings and the emotions they perceive in others.

Sequence 1 and 2 - Using rural or urban pictures, the child constructs a story and relates it to other members.

Objectives: To develop creative expression and assess the extent to which child has generalized his exposure to cause and effect relationships.

Verbal Clues - Child thinks of something (mental image) and gives clues about it and other children attempt to guess it.

Creative Expression - To construct something and other children attempt to guess what it is. Child must give clues to help in identification.

APPENDIX C

Inquisitive Games, Exploring Numbers and Spaces

Exploring Numbers and Spaces- Sequential activities for learning mathematical concepts.

A. Games in this group are designed to develop the child's concept of spatial relationships through kinesthetic and spatial cues.

Games and Activities	Objectives
Obstacle Course	To develop the child's awareness of his own body in relation to an object.
Chairs	To develop the child's ability to use kinesthetic and temporal cues in making spatial judgements.
Road Game I	To provide practice in using kinesthetic and temporal cues as an aid to spatial estimation.
Road Game II	To develop the child's ability to use visual cues and previous experience to make fine discriminations of spatial relationships (no kinesthetic cues).
Colored-Stick Activities	
Activity I - Identifying Colors	To develop the child's ability to identify colors of sticks.
Activity 2 - Free Play	To encourage independent discoveries about the characteristics of the sticks by manipulating them during free play.

B. Games in this group use colored sticks to develop the child's ability to classify by color, size, and sequence, and to develop the concepts of equivalence, spatial relationships, and estimation.

Activity 1 - Identifying Colors	To develop the child's ability to identify colors of sticks.

Activity 2 - Free Play	To encourage independent discoveries about the characteristics of the sticks by manipulating them during free play.
Activity 3 - Classification by Color	To develop the child's ability to classify by color.
Activity 4 - Fence	To develop the child's ability to classify by color and size.
Activity 5 - Touch	To develop the child's ability to use the sense of touch to discriminate differences in size.
Activity 6 - Ordinal Position I	To develop the child's ability to construct a sequence by size. To introduce the words *first*, *second*, *third*, *fourth*, and *fifth*.
Activity 7 - Ordinal Position II	To develop the child's ability to construct a sequence by size and color. To review the words *first*, *second*, *third*, *fourth*, and *fifth*.
Activity 8 - Stairway	To develop the child's ability to construct a sequence by size and color.
Activity 9 - Guess	To provide experience with size sequence.
Activity 10 - Paper Bag	To develop the child's ability to use the sense of touch to discriminate slight differences in size.
Activity 11 - Replacement	To develop the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangement of its parts.
Activity 12 - Blocks	To reinforce the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangement of its parts.

Squares Game (Playing the Game)	To determine the degree of the child's understanding of the concept that length may be composed of different parts.
(Late-Play Activities)	To reinforce the concept presented in the Squares Game by imposing more demanding rules for stick replacement and by using white sticks for replacement.
Equivalence (Playing the Game)	To extend the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangements of its parts.
(Later-Play Activities)	To reinforce the concepts of the Equivalence Game by using white sticks.
Estimation I (Playing the Game)	To develop the child's ability to use visual cues to estimate spatial relationships. To extend the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangment of its parts.
(Later-Play Activities)	To reinforce the concepts of the Estimation Game by using white sticks.
House Game (Lead-in Activities)	To review possible stick combinations that can be used to make a given length. To familiarize the child with the House Game playing board.
(Playing the Game)	To develop the concept that length is composed of shorter lengths added together.
(Later-Play Activities)	To reinforce the concept of the House Game by imposing more demanding rules for stick replacement and by using white sticks for replacement.

Steps Game (Lead-in Activities)	To review sequencing by size and color. To familiarize the child with the Steps Game playing board.
(Playing the Game)	To extend the child's ability to construct a sequence according to size and color. To provide practice in performing additive operations.
(Later-Play Activities)	To reinforce the concepts of the Steps Game by removing color cues.

C. Games in this group are designed to develop the child's ability to recognize, seriate, and write the numerals 1 through 9.

One to Three Game Version 1	To reinforce the child's recognition of the numerals 1 through 3.
Version 2	To develop the concept that the numerals 1, 2, 3 represent sets of objects.
(Later-Play Activities)	To reinforce the concept that the numerals 1, 2, 3 represent sets of objects.
One to Six Game Version 1	To reinforce the child's recognition of the numerals 1 through 6.
Version 2	To develop the concept that the numerals 1 through 6 represent sets of objects.
(Later-Play Activities)	To reinforce the concept that the numerals 1 through 6 represent sets of objects.
One to Nine Game Version 1	To reinforce the child's recognition of the numerals 4 through 9.
Version 2	To develop the concept that the numerals 1 through 9 represent sets of objects.
(Later-Play Activities)	To reinforce the concept that the numerals 1 through 9 represent sets of objects.

D. Games in this group are an extension of the games in previous groups and deal with more abstract mathematical concepts.

Plus and Minus Signs	To familiarize the children with the plus and minus signs.
Buy and Sell Game 1 (Lead-in Activities)	To develop the concepts of addition and subtraction. To develop an understanding of the record-keeping function of numerals. To develop the ability to classify according to family.
Buy and Sell Game 1 (Play the Game)	To reinforce the concepts taught in the lead-in activities.
Buy and Sell Game II (Lead-in Activities)	To extend the concept of addition and subtraction. To reinforce the child's understanding of the record-keeping functions of numerals. To reinforce the child's ability to classify according to family. To introduce mathematical sentences.
(Playing the Game)	To reinforce the concepts taught in the lead-in activities.
Animal Toss Game (Lead-in Activities)	To familiarize the child with the animals used in the game. To develop the child's understanding of the concepts "more than" and "less than." To provide experiences in counting.
(Playing the Game)	To extend the concepts "more than" and "less than." To develop the child's understanding of the terms plus, minus, and equals.
Land and Water Animals Game (Lead-in Activities)	To familiarize the children with the game board and playing cards used in this game. To provide experiences in counting. To provide experiences in classification by family.
(Playing the Game)	To develop the concepts "more than" and "less than." To extend the child's ability to classify by family.

Theater Tickets Games I and II (Lead-in Activities)	To introduce the concept of multiple-class membership. To reinforce the concepts of "more than" and "less than." To provide practice in performing the operations of addition and subtraction.
(Playing the Game)	To extend the concepts introduced in the lead-in activities.
Estimation II	To extend the concepts that (1) any length is composed of shorter lengths added together and (2) the terms "more than" and "less than" describe relationships. To extend the child's ability to make accurate spatial judgments. To develop the child's ability to solve problems involving logical relationships.
Estimation III (Playing the Game)	To develop the child's ability to apply the previously learned concepts that (1) any length is composed of shorter lengths added together, (2) the terms "more than" and "less than" describe relationships, and (3) there are specific relationships between the lengths of the colored sticks. To extend the child's ability to make accurate spatial judgments.
(Later-Play Activities)	To further extend the child's ability to make accurate spatial judgments by removing color cues.
The Two Game The Three Game The Four Game The Five Game	To develop insights into the nature of equivalence.
(Later-Play Activities)	To determine the extent of transfer of learning from the Two, Three, Four, and Five Games.

APPENDIX D

Intelligence

Stanford Binet Intelligence Scale

The 1960 revision of the Stanford Binet Intelligence Scale by Terman and Merrill retains the major characteristics of the previous Binet scales. It is an age scale making use of age standards of performance and undertakes to measure intelligence regarded as general mental adaptability rather than measuring several separate mental faculties such as memory, attention, sensory discrimination, etc. The 1960 scale incorporates in a single form, designated as the L-M form, the best subtests from the 1937 scales. (p. 39)

"One of Binet's basic assumptions of the original scale was that a person is thought of as normal if he can do the things persons of his age normally do, retarded if his test performance corresponds to the performance of persons younger than himself, and accelerated if his performance level exceeds that of persons his own age." The Stanford Binet provides appropriate groups of test items for ages 2 through adult. Test items are grouped in terms of age levels, increasing in difficulty with each age level and generally progressing from concrete, manipulative tasks to more abstract, verbal tasks.

The test is administered individually by a trained examiner. The examiner begins testing the child at a point at which he is likely to have success, usually at an age level just below the child's chronological age. (p. 59) Testing ends at the "ceiling level," i.e., the age level at which the child can no longer successfully do the tasks required for that level.

Test scores are interpreted in terms of mental age (MA) and intelligence quotient (IQ).

APPENDIX E

Intelligence

Wechsler Intelligence Scale for Children

> The Wechsler Intelligence Scale for Children, developed by David Wechsler, represents a logical outgrowth of the Wechsler-Bellevue Intelligence Scales used with adolescents and adults. Most of the items on the WISC are from Form II of the earlier scales; the main additions are new items at the easier end of each test to allow for testing of younger children. (p. 1)

The WISC differs from other individual intelligence tests for children in three major ways:

1. The concept of mental age (MA) as a basic measure of intelligence is abandoned because of inconsistencies in interpretation of its meaning. (p. 2)

2. In the standardization of the present scale, IQ's are obtained not by comparing a subject's performance with the performance of a composite age group, but rather by comparing the individual's test scores with scores earned by others in his or her own age group. (p. 3)

3. The theory underlying the WISC defines general intelligence in terms of the whole personality rather than a unitary trait or ability. "No attempt has been made to get together a series of tests that measure 'primary abilities' or to order them into a hierarchy of relative importance." (p. 5).

The WISC tests children ages 5 though 15. Administration of the test is done on an individual basis by a trained examiner according to specifically stated testing directions. The WISC-Verbal Scale was utilized in this study as it is predictive and highly related to school related success.

The WISC-Verbal Scales consists of 5 verbal subtests and one alternate or supplementary subtest. The subtests are listed below:

A. Verbal Scale

1. General Information
2. General Comprehension
3. Arithmetic
4. Similarities
5. Vocabulary
6. Digit span (supplementary)

Raw scores are converted to scaled scores which are then interpreted in terms of a "deviation IQ" which represents the child's relative intelligence rating and indicates ". . . the amount by which a subject deviates above or below the average performance of individuals of his own age group." (p. 4)

APPENDIX F

Intelligence

Primary Mental Abilities Test

The theoretical basis for the Primary Mental Abilities Tests is L. G. Thurstone's group factor theory of intelligence. He maintained that certain mental activities have in common a primary factor that distinguishes them from other groups of mental activities and that each of these other groups has a different primary factor which is for the most part independent. However, high intercorrelations among subtests lead to the current position that there is additionally a second order general factor involved.

The PMA tests for the first grade were administered in small groups of four using individual booklets. All the material is presented pictorially and no reading is required.

The four primary mental abilities measures are:

Verbal meaning: defined in the examiner's manual as "the ability to understand ideas expressed in words." (Thurstone, 1963) The task ranges in complexity from choosing and marking the picture of a simple noun to choosing and marking the picture that represents the end result of a given sequence of events.

Perceptual speed: defined as "the ability to recognize likenesses and differences between objects or symbols quickly and accurately." (Thurstone, 1963) The children are required to find and mark matching pictures from series of four choices each. This is the only part of the tests that is timed in the first grade battery.

Number facility: defined as "the ability to work with numbers, to handle simple quantitative problems accurately and to understand and recognize quantitative difference." (Thurstone, 1963) This part includes such tasks as marking a specific number of items, marking items by position, and marking items to indicate the correct solution to word problems requiring addition and subtraction.

Spatial relations: defined as "the ability to visualize objects and figures rotated in space and the relations between them." (Thurstone, 1963) This section has two parts. The first is to find and mark the missing part of a number of squares. The second is to complete partially drawn designs in accord with a completed model.

Raw scores are converted to mental age scores and a profile can be drawn to indicate for an individual child, areas of strength and weakness. The total raw score can also be assigned a mental age and together with the child's chronological age yield a quotient score providing an estimate of intelligence similar to scores on other intelligence measures.

APPENDIX G

Language Ability

The Illinois Test of Psycholinguistic Abilities

The Illinois Test of Psycholinguistic Abilities, authored by Samuel A. Kirk and James J. McCarthy, is a diagnostic measure for uncovering specific linguistic abilities and disabilities in children aged two to nine years. There are nine subtests in the ITPA, each designed to test a specific aspect of psycholinguistic ability. The tests are based on Charles E. Osgood's theoretical model of the dynamics of psycholinguistic functioning. Four of the nine subtests were used in collecting our data: the Visual Decoding test, the Auditory-Vocal Association test, the Visual-Motor Association test, and the Vocal Encoding test.

The Visual Decoding subtest measures the child's ability to comprehend pictures and written words. It is assessed by a technique in which the subject selects from among a set of pictures the one which is most similar in concept to a previously shown stimulus picture.

The Auditory-Vocal Association test assesses the ability to relate spoken words in a meaningful way. Subjects complete a test statement by supplying an analogous word. The examiner might say "Soup is hot; ice cream is ____."

The Visual-Motor Association subtest assesses the ability to relate meaningful visual symbols. The child selects from among a set of pictures the one which most meaningfully relates to a given stimulus picture.

Vocal Encoding is the ability to express one's ideas in spoken words. The Vocal Encoding subtest measures this ability by having the examiner ask the subject to describe simple objects such as a block or ball.

Language age norms have been provided for the ITPA in order that results can be compared with other psychological and physiological measures of children which are expressed in terms of age scores. Standard score norms are also provided.

APPENDIX H

Language Ability

Verbal Stories

Since the verbal stories are not a standardized test they warrant some explanation. Each child was individually given the W-5, I Wonder Card, from the Peabody Language Development Kit, Level II. He was asked to tell the best and most interesting story that he could. The stories were analyzed in terms of total number of words, total number of adjectives, total number of simple verbs, total number of complex verbs, mean sentence length, and each story was rated for creativity, abstraction, and language quality on the basis of a six point scale by two raters. A copy of the rating scale used is presented below.

Creativity

1. No creative content; object naming, unelaborated description

2. Minimum creativity shown; 1 or 2 objects, actions, details added to the picture content

3. Some creativity shown; rudiments of a story - one sentence narrative, projection of what happened, or is going to happen (one step in sequence only) (He is going to open it).

4. Definite creativity shown; meaning added to the picture content to make it a sequence of events showing some imagination and going beyond the stimulus content (two or more sequential steps to narrative)

5. A creative story; a fairly meaningful, coherent, story that has some degree of unusualness

6. A very creative story; a meaningful, coherent, imaginative story.

Abstraction

1. Object naming

2. Simple description of picture beyond object naming (e.g. "a boy swimming)".

3. Mostly description but some inter-relating between characters and/or objects in the picture (The boy is swimming to the box).

4. A narrative that integrates aspects within the picture and includes emotions and actions attributed to the characters (He caught the fish).

5. A narrative that projects emotions and actions beyond the stimulus presented in the picture. (The baby turtle went and told his mama).

6. A narrative that interprets different aspects of the picture, is relevant to it, but goes well beyond the picture in content.

Language Quality

1. Very sparse quality; generalized, simple vocabulary. No descriptive terminology (Listing objects by most general terms).

2. Use of at least one descriptive adjective and one action word (verb); still very generalized (little fishes, two boys, some shells, swimming, going), mostly listing - not complete sentences.

3. Use of more explicit nouns (whale, ocean, jellyfish), not really vivid, basic action verbs (saw, fell, looked), generalized adjectives (one, some, another), mostly complete sentences. Descriptions.

4. Use of descriptive phrasing (turned upside down, went down through the water) explicit verbs (dive).

5. Vivid description, explicit nouns and adjectives that conjure up a specific picture (treasure chest, shark, dolphin), personalization of characters (Moby Dick, more than naming, use of dialogue between characters).

6. Excellent command of vivid vocabulary and grammar in describing objects and actions.

APPENDIX I

Language Ability

Picture Story Language Test

The Picture Story Language Test by Helmer R. Myklebust is a standardized measure designed to study written language developmentally and diagnostically. The test consists of the presentation of a standard picture about which subjects are asked to write a story. Their responses are then evaluated on each of three scales in order to obtain a profile of abilities with respect to their facility with written language. The scales are Productivity, Syntax and Abstract-Concrete and each is considered equally essential to effective communication.

The Productivity Scale consists of three measures; all considered necessary at some minimum level for useful communication to occur. These measures are Total Words, Total Sentences and Words per Sentence.

The Syntax Scale is a measure of correctness in language usage and is scored as Error Categories and Error Types. The Error Categories are Word Usage, Word Endings and Punctuation and the Error Types are Additions, Omissions, Substitutions and Word Order. Final scores are reported as Syntax Quotients which are composite scores of errors and correctness.

The Abstract-Concrete Scale is a measure of effectiveness with which ideas are conveyed and consists of a series of definitions which serve as criteria for rating the level of abstract thought on a scale from 1 to 5. The Abstract-Concrete Scale is seen as a continuum with ideas bound to what is observable in the picture being concrete and ideas detached from the observable as abstract.

APPENDIX J

Language Ability

Auditory Discrimination Test

The Auditory Discrimination Test developed by Joseph M. Wepman is a measure to determine a child's ability to recognize the fine differences that exist between the phonemes used in English speech, an ability which has been found to be somewhat related to reading ability. This measure can be useful as a screening device to identify five- and six-year-old children who are likely to experience difficulty learning the phonics necessary for reading.

The child is asked to listen to the examiner read pairs of words and to indicate whether the words are the same or different. The test is composed of forty word pairs which include comparisons between initial consonants, final consonants, medial vowels, and ten false choices (a single word repeated).

APPENDIX K

Reading Ability

Spache Diagnostic Reading Scales

The Diagnostic Reading Scales, developed by George D. Spache, are a series of individually administered tests developed to provide standardized evaluations of oral and silent reading skills and of auditory comprehension. The battery consists of three Word Recognition Lists, twenty-two Reading Passages of graduated difficulty, and six supplementary Phonics Tests.

The Word Lists test the reader's skill at word recognition and analysis and also determine the level at which testing should begin in the Reading Passage.

The Reading Passages, of the same type and range of reading material used in classrooms for reading assignments from mid-first grade to eighth grade, include narrative, expository, and descriptive selections. The Reading Passages are used to obtain grade level scores for each pupil as follows:

1. The Instructional Level (Oral Reading) - an indication of the child's grade level in oral reading thus implying the grade level of basal reading materials to which the child should or would be exposed in a typical classroom.

2. The Independent Level (Silent Reading) - the grade level of supplementary instructional and recreational reading materials which the child can read to himself with an adequate degree of comprehension, even though he may have some word recognition difficulties.

3. The Potential Level (Auditory Comprehension) - an indication of the level to which a child's reading can grow when existing difficulties with mechanics or vocabulary are overcome.

The Phonics Tests measure the following specific phonic skills; consonant sounds, vowel sounds, consonant blends, common syllables, blends, and letter sounds.

For this research project grade level scores were obtained on the Word Recognition lists, plus the Instructional and Potential Levels on the Reading passages.

APPENDIX L

Arithmetic Ability

Arithmetic Subtests of the Stanford Achievement Test II

The Arithmetic subtests of the Stanford Achievement Test II contain 63 items in three parts: Measures, Problem Solving, and Number Concepts.

The Measures part evaluates the pupil's understanding of the meaning of measurement and basic knowledge of standard units.

The Problem Solving part evaluates the pupil's ability to do simple computations and to understand the language of problems.

The Numbers Concepts part of the test includes, among other things counting by two's, knowledge of easy addition and subtraction facts, meaning of a unit fraction, and ability to pair an array of objects with its number name.

APPENDIX M

Arithmetic Ability

Arithmetic Subtest of the Wechsler Intelligence Scale

The Arithmetic Subtest of the Wechsler Intelligence Scale for Children is part of the Verbal Scale of the tests and consists of 16 problems which are stated in terms of directions and questions.

Problems 1 through 13 are read to the subject by the examiner. Problems 14, 15, and 16 are printed on cards to be read by the subject himself. Problems must be done mentally by the child, i.e., without the aid of paper and pencil. Each problem has a specified time limit which begins after the first statement of the problem by the examiner. (p. 64)

Raw scores are converted to scaled scores which are then interpreted in terms of a "deviation IQ" which represents the child's relative intelligence rating and indicates ". . . the amount by which a subject deviates above or below the average performance of individuals of his own age group." (p. 4)

APPENDIX N

Mathematics Performance Measure

The Mathematics Performance Measure was designed for this study. Its purpose is to present the child with an opportunity to demonstrate his mathematical capabilities in a relatively unstructured, creative, and performance oriented manner. The children, in groups of four, are given sheets of paper with two groups of numbers on each and instructed to make up as many mathematics problems and answers as they can using those numbers. The scoring criteria take into account productivity, variety, accuracy, complexity, and perceptual motor skills.

Instructions:

Let's see how many problems and answers you can make with these numbers. You can make any kind of problems you want to. Use the numbers in as many ways as you can. For example, if we had the numbers 1 and 2 here are two ways you can make problems:

$1 + 1 = 2$

$2 - 1 = 1$

Now see what else you can do with the numbers 1 and 2.

Scoring Criteria:

1. Total number of problems attempted; broken down by types of problems as follows:
    a. Addition
    b. Subtraction
    c. Greater than and less than
    d. Multiplication
    e. Division
    f. Fractions (post third grade)
    g. Money (post third grade)
2. The accuracy of the problems attempted.
3. The ability to make a correct mathematical statement.
4. Utilizing the patterns in the groups of numbers given.
5. Using one of the numbers given as an answer.
6. Handwriting reversals.

Number Series Used:

Post First Grade
- 4, 1
- 5, 2, 3,
- 1, 3, 8
- 2, 7, 4, 1

Post Second Grade
- 5, 2, 3
- 2, 7, 4, 1
- 3, 4, 12
- 143, 132, 11

Post Third Grade
- 3, 4, 12
- 282, 264, 18
- 4, 1/2, 2
- 321, 642, 2
- $4.10, $6.25, $2.15
- 3 1/4, 5, 1 3/4

Sample Page

Name________________________ Grade 2________ Date ________

3, 4, 12

143, 132, 11

APPENDIX O

Personal Social Characteristics

Teacher Rating Scale

Directions: For items A through E, circle the number of the statement that best describes the child.

Child's name________________________

School______________________________

Teacher_____________________________

The child's behavior:

A. Ratings on effort:

1. The child almost never tries his best or puts his best effort to his activities.
2. The child puts some effort into his work but could try harder most of the time.
3. The child shows a lot of effort but on many occasions does not try as hard as he could.
4. He is a very hard worker and usually puts his best effort into an activity.

B. Ratings on persistence:

1. The child shows little persistence and stops very quickly when any activity presents a challenge.
2. The child shows some persistence but gives up after only a short attempt at solving a problem or working at an activity which is challenging.
3. The child is quite persistent and will stick to a task or challenge for some time but gives up more quickly than some children.
4. The child shows a great deal of persistence and when confronted with a challenge or a problem which he cannot easily solve will stick with trying for much longer than average.

C. Ratings on goal directedness:

1. The child rarely gives evidence of working toward a given goal or evaluating his activities and work.

2. There appears to be some direction in the child's activity with some goal in mind, but little interest or checking to see if the goal is being reached or worked toward.

3. The child, when working appears to have a goal definitely in mind, shows some indication of making observations about his activity and whether or not this is leading to the goal toward which he is working.

4. The child is very observant of what he does; he is usually conscientious of the goal toward which he is working and appears to evaluate, look at, and check out whether or not he is moving toward a given goal in the activity.

D. Independence of work:

1. The child rarely works things out on his own and quickly seeks the help of other people.

2. The child will work on his own but only on tasks that are not difficult and challenging. On these tasks he rather quickly seeks the help of someone else.

3. The child generally likes to try things on his own and work them out on his own but if they become somewhat difficult will seek out help or assistance from the teacher or another child.

4. The child shows a great deal of independence in his work, likes to try things on his own and tries to work out problems and activities without the help of others even when they become difficult.

E. Ratings on fear of failure:

1. The child becomes quite upset and shows little confidence in himself when confronted with failure or when he is unable to complete or satisfactorily work out a task.

2. The child shows a mild lack of confidence and becomes somewhat upset when confronted with failure or when he is unable to complete a task or do well.

3. The child is quite confident of his own abilities and only shows minor concerns of feelings of inadequacy when he fails to complete a task or feels he has not done well.

4. The child appears to be very confident of his abilities and is not upset when he fails at a task or is unable to complete the task.

APPENDIX P

Personal-Social Characteristics

Florida Key

The Florida Key by W. Purkey, W. Graves, and B. Cage is a scale for use by teachers to infer student self-concept as a learner. It consists of eighteen behavioral descriptions for which the teacher is asked to compare the student with other students his age. All comparisons are made on the basis of the child's school behaviors. A factor analysis of the scale revealed four self-concept factors which the authors have labeled Relating, Asserting, Investing, and Accomplishing. Split-half reliability was found to be .93 with a range of .62 to .96 for teachers using the scale. As a validity measure, seven Florida Key items were correlated with the school factor on the Coopersmith Self-Esteem Inventory. This was found to be .33. Other validation studies asked teachers to choose students they thought felt good and poorly about themselves as learners. Florida Key scores were found to be highly related to these teacher judgements of student's self concept. (Purkey, Graves & Cage, 1972). The Florida Key was developed as an alternative to self-report measures to assess self-concept and combines the inferential method with a quickness and ease of use not possible with inference by trained observers.

Personal-Social Characteristics

Florida Key

TEACHER FORM

This scale is to assist you, the teacher, in evaluating how the student perceives his or her "learner" self. Please select one of the following answers and record the number in the blank space.

	VERY	ONCE IN	OCCASION-	FAIRLY	VERY
NEVER: 0	SELDOM: 1	AWHILE: 2	ALLY: 3	OFTEN: 4	OFTEN: 5

____
Name of Student to be Evaluated

Compared with other students his age, does this student:

1. get along with other students? _____
2. get along with the teacher? _____
3. keep calm when things go wrong? _____
4. say good things about his school? _____
5. tell the truth about his school work? _____

Relating _____

6. speak up for his own ideas? _____
7. offer to speak in front of the class? _____
8. offer to answer questions in class? _____
9. ask meaningful questions in class? _____
10. look people in the eye? _____
11. talk to others about his school work? _____
12. join in school activities? _____

Asserting _____

13. seek out new things to do in school on his own? _____
14. offer to do extra work in school? _____

Investing _____

15. finish his school work? _____
16. pay attention to class activities? _____
17. do his school work carefully? _____
18. read in class? _____

Accomplishing _____

TOTAL _______

APPENDIX Q

The Children's Form of the Rosenzweig Picture-Frustration Study

The Children's Form of the Rosenzweig Picture Frustration Study by Saul Rosenzweig, Edith E. Fleming and Louise Rosenzweig is a limited projective device designed to evaluate modes of responses to stressful situations. Children are presented with 24 cartoon-like drawings of different everyday stress producing situations and are allowed to identify with and respond for anonymous figures in the drawings. Although first designed for use with adults this device was well adapted for use with children because of its game-like quality.

Children's responses to the frustrating situations are assumed to reflect their identification with the frustrated individual pictured and to project their own bias in their replies. This bias is scored by dividing the responses into various categories under the headings of direction of aggression and type of reaction.

Direction of aggression consists of three categories. The first of these is extrapunitiveness (E) which is aggression directed at the environment. Intropunitiveness (I) is aggression turned by the subject onto himself. Impunitiveness (M) is aggression which is evaded in an attempt to gloss it over.

Type of reaction also consists of three categories. Obstacle dominance (O-D) is a type of reaction which involves responses which emphasize the barrier causing the frustration. Ego defense (E-D) describes responses in which the ego of the subject predominates and need persistence (N-P) describes responses in which the solution to the frustrating problem is emphasized.

By combining these six categories a total of nine possible scoring factors are obtained. A subject's score is then determined by the total number of responses that occur on each of the nine factors as he responds to all the drawings. These scores can then be figured as percentages and compared to available age norms.

A final measure obtained from the scores on this test is called the Group Conformity Rating (GCR) which reflects the modal response to each item given by a normal sample of the population. The individual's responses can be compared to these norms.

The norms available for children range from four to thirteen years of age with age levels of two years.

APPENDIX R

Personal-Social Characteristics

Parental Questionnaire

Second Grader's Name:____

Address:____

As you know, your second grader is a member of a special group whose school progress is being followed in connection with Dr. Sprigle's Learning to Learn School.

The following questionnaire will provide information which will be helpful in evaluating the program. Please answer all the questions as well as you can. The person who delivers this questionnaire will return to pick it up and will help you with questions that are not clear to you. All the information you give us will be kept confidential.

Thank you.

Father: Age:_____ Occupation:________________________

Income per week:___________________

Education: ___8th grade or less; ___9th ___10th ___11th ___12th

___college (list number of years completed)

___trade school (list)

Mother: Age:_____ Occupation:________________________

Income per week:___________________

Education: ___8th grade or less; ___9th ___10th ___11th ___12th

___college (list number of years completed)

___trade school (list)

Does your family receive any regular additional income from other sources such as other family members who work, ADC, welfare, etc.?

How much is the total family income per week?_________________

Family: Does your second grader live with both his parents?_______________

If not, which parent is your second grader living with?__________

Please list the child's brothers and sisters as follows:

Brother or sister	Age	Grade in School

1. What subjects is your child studying in second grade? (Please list)

Which one is easiest for him?____

Which one is hardest for him?____

2. How often does your second grader do school work at home? (Check one)

_____3 or more times a week _____ about once a week _____2 to 3 times a month

_____never _____not sure

Please list 2 or 3 things he has done for school work at home? (Check one)

3. Does your second grader need help with his school work at home? (Check one)

____often ____sometimes ____seldom ____never ____not sure

4. If he does need help who usually helps him? (Check one)

____Mother ____Father ____Sister or Brother ____ Classmate ____Other (list)

5. How is your child doing in second grade? (Check one)

____very well ____ average ____ poor ____ failing ____ not sure

6. How do you get information about how your child is doing in second grade? (Check as many as apply)

____ report card ____Parent-Teacher Conference ____ phone calls

____ PTA meetings ____ work he brings home ____ other (list)

7. Does the school tell you ways to help your second grader at home?

____

____

____

8. Which of the following things do you have on hand at home for your second grader to use?

____ television
____ doll toys
____ radio

____ paper, colors, paints
____ books and magazines
____ record player

____ scissors, paste
____ blocks, tinkertoys
____ cards, other games

9. Check in order (number items 1, 2, 3) the three things your second grader does most often when he is indoors.

____play dolls
____watch television
____cut and paste
____listen to music
____look at books or magazines

____ draw, color, and paint
____ build with blocks, tinkertoys, etc.
____ play cards and other games
____ play "cowboys and Indians" games
____ other (list)

10. How often does your second grader bring books home from school to read to you?

____ 3 or more times a week ____ about once a week ____ 2 to 3 times a month

____ never ____ not sure

How well does he read?____

11. How often does your second grader do arithmetic problems at home? (Check one)

____ 3 or more times a week ____ about once a week ____ 2 to 3 times a month

____ never ____ not sure

Can he count?	___ yes	___ no	___ not sure
Can he add?	___ yes	___ no	___ not sure
Can he subtract?	___ yes	___ no	___ not sure
Can he multiply?	___ yes	___ no	___ not sure
Can he divide?	___ yes	___ no	___ not sure

12. How often does your second grader practice writing at home? (Check one)

___ 3 or more times a week ___ about once a week ___ 2 to 3 times a month

___ never ___ not sure

Can he write his name?	___ yes	___ no	___ not sure
Can he copy sentences?	___ yes	___ no	___ not sure
Can he make up sentences and write them down?	___ yes	___ no	___ not sure
Can he spell simple words?	___ yes	___ no	___ not sure

13. What do you feel is the most important subject a child should learn in school? (Check one)

___Reading ___ Writing ___ Language ___ Arithmetic ___ Science ___ History

14. What has your second grader learned in school this year besides his lessons?

15. What do you feel is the most important thing you can teach him at home?

APPENDIX S

Perceptual Motor Ability

The Bender Gestalt Test

The Bender Gestalt Test, developed by Laurett Bender in 1938, consists of nine figures originally used by Wertheimer to demonstrate the principles of Gestalt Psychology as related to perception. Bender's adaptation of the test uses the figures as a visual motor test. The cards are presented one at a time to a subject who is told to copy them on a blank piece of paper. For this project the Bender protocols of all subjects were evaluated using the Developmental Bender Scoring System (Koppitz, 1963) which consists of thirty mutually exclusive scoring items recorded as either present or absent. Scoring categories include distortion of shape, rotation, substitution of circles for dots, perseveration, failure to integrate the parts of a figure, substitution of angles for curves, and extra or missing angles. Since the Bender Test is scored for errors a high score reflects a poor performance while a low score reflects a good performance. Normative data are available for children from ages five years to eleven years.

APPENDIX T

Post Second Grade Analysis of Variance Comparisons between the Experimental and Control Groups

Measure	Grp.	N	$\overline{X}$	SD	DF BG	 WG	F Ratio	Level of Sign.
Intelligence								
SBIQ	E	39	103.64	13.62				
	C	39	86.31	11.96	1	76	35.67	.001
WISC-VIQ	E	39	103.15	11.34				
	C	39	88.85	8.18	1	76	40.83	.001
PMA-DQ	E	38	93.89	17.64				
	C	38	73.74	20.76	1	74	20.81	.001
Achievement								
School Grades	E	38	10.26	1.94				
	C	39	6.77	3.44	1	75	29.85	.001
SAT-II	E	39	18.75	5.27				
(Total-8 Tests)	C	38	13.51	5.66	1	75	17.68	.001
Reading								
Reading School	E	38	2.61	.79				
Grades	C	39	1.41	.97	1	75	35.23	.001
Spache Diagnostic								
Reading Test-	E	39	3.35	1.04				
Instructional	C	39	1.96	1.12	1	76	32.17	.001
Reading Level								
Spache Diagnostic								
Reading Test-	E	39	3.78	.95				
Potential	C	39	3.03	1.12	1	76	10.05	.01
Reading Level								
Arithmetic								
Arithmetic School	E	38	2.68	.77				
Grades	C	39	1.67	.93	1	75	27.23	.001
Arithmetic Tests	E	39	4.74	1.46				
SAT II - 2 Tests	C	38	3.23	1.51	1	75	19.84	.001
Arithmetic Subtest	E	39	11.03	2.42				
WISC	C	39	8.72	2.16	1	76	19.69	.001

con't

Measure	Grp.	N	$\overline{X}$	SD	DF BG	DF WG	F Ratio	Level of Sign.
Language								
ITPA-Vocal Encoding	E	39	86.36	18.02				
	C	39	73.95	15.46	1	76	10.66	.01
ITPA-Aud.-Vocal Assoc.	E	39	94.21	11.55				
	C	39	78.97	10.44	1	76	37.32	.001
Verbal Stories								
Words Per Sentence	E	38	10.84	2.58				
	C	38	8.07	2.88	1	74	19.50	.001
Total Sentences	E	39	12.15	7.01				
	C	38	9.16	4.73	1	75	4.81	.05
Written Stories								
Words Per Sentence	E	38	8.33	2.45				
	C	38	5.07	4.19	1	74	17.20	.001
Total Sentences	E	38	4.76	2.69				
	C	38	2.63	2.50	1	74	12.84	.001
Syntax Quotient	E	38	87.79	5.66				
	C	38	56.02	39.89	1	74	23.63	.001
Auditory Discrimination	E	35	70.09	9.76				
	C	36	64.39	12.14	1	69	4.73	.05
Personal-Social								
Self Concept-Florida Key	E	37	58.49	12.37				
	C	39	49.46	24.28	1	74	4.10	.05
Achievement Motivation-Teacher Ratings	E	39	13.13	3.59				
	C	35	10.46	4.56	1	72	7.92	.01
Citizenship Grades	E	38	2.26	.83				
	C	39	1.74	1.16	1	75	5.07	.05
Perceptual Motor								
Bender Gestalt	E	39	4.74	2.27				
	C	39	7.21	3.80	1	76	12.07	.001

APPENDIX U

Post Second Grade Analysis of Variance Comparisons between Experimental and Control Subgroups whose Pre-Project Stanford Binet Intelligence Quotients were within or above the Average Range of Intelligence (SBIQ 90 or >)

Measure	Grp.	N	$\bar{X}$	SD	DF BG	DF WG	F Ratio	Level of Sign.
Intelligence								
SBIQ	E	18	111.56	7.83				
	C	18	93.00	11.46	1	34	32.16	.001
WISC-VIQ	E	18	108.33	8.22				
	C	18	92.22	6.26	1	34	43.71	.001
PMA-DQ	E	17	104.65	12.38				
	C	18	79.22	20.82	1	33	18.99	.001
Achievement								
School Grades	E	17	10.76	1.52				
	C	18	7.83	3.24	1	33	11.50	.01
SAT-II (Total-8 Tests)	E	18	20.91	4.00				
	C	18	14.11	6.16	1	34	15.43	.001
Reading								
Reading School Grades	E	17	2.71	.77				
	C	18	1.72	.83	1	33	13.21	.001
Spache Diagnostic Reading Test-Instructional Reading Level	E	18	4.02	.76				
	C	18	2.36	1.20	1	34	24.50	.001
Spache Diagnostic Reading Test-Potential Reading Level	E	18	4.15	.71				
	C	18	3.30	1.01	1	34	8.57	.01
Arithmetic								
Arithmetic School Grades	E	17	3.00	.61				
	C	18	1.89	.83	1	33	20.04	.001
Arithmetic Tests SAT II - 2 Tests	E	18	5.36	.89				
	C	18	3.39	1.61	1	34	20.48	.001
Arithmetic Subtest WISC	E	18	11.94	1.92				
	C	18	9.39	1.65	1	34	18.30	.001

con't

Measure	Grp.	N	$\overline{X}$	SD	DF		F Ratio	Level of Sign.
					BG	WG		
Language								
ITPA-Vocal	E	18	84.94	16.93				
Encoding	C	18	81.11	15.28	1	34	.51	NS
ITPA-Aud.-Vocal	E	18	100.94	9.02				
Assoc.	C	18	82.22	5.87	1	34	54.50	.001
Verbal Stories								
Words Per	E	17	11.68	2.54				
Sentence	C	18	7.85	2.71	1	33	18.46	.001
Total Sentences	E	17	12.94	7.38				
	C	18	10.33	5.83	1	33	1.35	NS
Written Stories								
Words Per	E	17	8.83	2.75				
Sentence	C	18	5.82	4.59	1	33	5.43	.05
Total Sentences	E	17	4.89	3.30				
	C	18	3.39	2.43	1	33	2.35	NS
Syntax Quotient	E	17	89.07	6.98				
	C	18	73.06	28.97	1	33	4.91	.05
Auditory	E	15	69.87	13.47				
Discrimination	C	18	66.44	13.00	1	31	.55	NS
Personal-Social								
Self Concept-	E	16	61.75	12.99				
Florida Key	C	18	50.50	25.91	1	32	2.46	NS
Achievement Motivation-Teacher Ratings	E	18	14.44	3.47				
	C	18	10.94	4.72	1	34	6.43	.05
Citizenship	E	17	2.24	1.09				
Grades	C	18	1.94	1.26	1	33	.53	NS
Perceptual Motor								
Bender Gestalt	E	18	4.33	2.14				
	C	18	6.28	3.44	1	34	4.14	.05

APPENDIX V

Post Second Grade Analysis of Variance Comparisons between Experimental and Control Subgroups whose Pre-Project Stanford Binet Intelligence Quotients were below the Average Range of Intelligence (SBIQ 89 or<)

Measure	Grp.	N	$\bar{X}$	SD	DF BG	DF WG	F Ratio	Level of Sign.
Intelligence								
SBIQ	E	21	96.86	13.99				
	C	21	80.57	9.23	1	40	19.84	.001
WISC-VIQ	E	21	98.71	11.92				
	C	21	85.95	8.64	1	40	15.78	.001
PMA-DQ	E	21	85.19	16.59				
	C	20	68.80	19.93	1	39	8.23	.01
Achievement								
School Grades	E	21	9.86	2.17				
	C	21	5.86	3.42	1	40	20.42	.001
SAT-II	E	21	16.90	5.60				
(Total-8 Tests)	C	20	12.98	5.27	1	39	5.32	.05
Reading								
Reading School	E	21	2.52	.81				
Grades	C	21	1.14	1.01	1	40	23.69	.001
Spache Diagnostic Reading Test- Instructional	E	21	2.78	.91				
Reading Level	C	21	1.61	.95	1	40	16.48	.001
Spache Diagnostic Reading Test- Potential	E	21	3.46	1.03				
Reading Level	C	21	2.80	1.19	1	40	3.68	NS
Arithmetic								
Arithmetic School	E	21	2.43	.81				
Grades	C	21	1.48	.98	1	40	11.76	.01
Arithmetic Tests	E	21	4.21	1.65				
SAT II - 2 Tests	C	20	3.09	1.44	1	39	5.37	.05
Arithmetic Subtest	E	21	10.24	2.57				
WISC	C	21	8.14	2.41	1	40	7.42	.01

con't

Measure	Grp.	N	$\overline{X}$	SD	DF		F Ratio	Level of Sign.
					BG	WG		
Language								
ITPA-Vocal	E	21	87.57	19.22				
Encoding	C	21	67.81	13.04	1	40	15.20	.001
ITPA-Aud.-Vocal	E	21	88.43	10.40				
Assoc.	C	21	76.19	12.66	1	40	11.71	.01
Verbal Stories								
Words per	E	21	10.16	2.46				
Sentence	C	20	8.26	3.08	1	39	4.77	.05
Total Sentences	E	21	11.85	6.79				
	C	20	8.10	3.27	1	39	5.01	.05
Written Stories								
Words Per	E	21	7.93	2.16				
Sentence	C	20	4.39	3.77	1	39	13.75	.001
Total Sentences	E	21	4.67	2.15				
	C	20	1.95	2.42	1	39	14.48	.001
Syntax Quotient	E	21	86.76	4.21				
	C	20	40.68	42.73	1	39	24.21	.001
Auditory	E	20	70.25	6.05				
Discrimination	C	18	62.33	11.19	1	36	7.56	.01
Personal-Social								
Self Concept-	E	21	56.00	11.58				
Florida Key	C	21	48.57	23.40	1	40	1.70	NS
Achievement								
Motivation-								
Teacher Ratings	E	21	12.00	3.38				
	C	17	9.94	4.46	1	36	2.62	NS
Citizenship	E	21	2.29	.56				
Grades	C	21	1.57	1.08	1	40	7.28	.05
Perceptual Motor								
Bender Gestalt	E	21	5.10	2.36				
	C	21	8.00	3.99	1	40	8.25	.01

APPENDIX W

A Post Second Grade Comparison of Experimental and Control Groups based on Pre-Project Levels of Intellectual Functioning

Pre-Project Intellectual Functioning
within or above Average Range of Intelligence
(Pre-Project Stanford Binet IQ 90 or above)

		$\overline{X}$	%	
Pre-Project SBIQ	E	100	46	
	C	98	48	
Post Second Grade[1]				
		X IQ	WOAAROI	
Intelligence				
SBIQ	E	113	100	
	C	93	56	
WISC-VIQ	E	109	100	
	C	92	50	
PMA-DIQ	E	105	94	
	C	79	17	
		$\overline{X}$ GPA	% ABC	% AB
Achievement Academic School Grades	E	2.7	99	63
	C	1.9	73	24
		$\overline{X}$ Gr. Level	% within 6 mths.	
SAT II - All Tests	E	2.7	80	
	C	1.9	34	
Reading		$\overline{X}$ GPA	% ABC	% AB
Reading School Grades	E	2.7	100	50
	C	1.7	61	17

Pre-Project Intellectual Functioning
below Average Range of Intelligence
(Pre-Project Stanford Binet IQ 89 or below)

		$\overline{X}$	%	
Pre-Project SBIQ	E	80	54	
	C	85	52	
Post Second Grade[1]				
		X IQ	WOAAROI	
Intelligence				
SBIQ	E	97	71	
	C	81	10	
WISC-VIQ	E	99	81	
	C	86	24	
PMA-DIQ	E	85	43	
	C	69	15	
		$\overline{X}$ GPA	% ABC	% AB
Achievement Academic School Grades	E	2.5	95	43
	C	1.6	54	19
		$\overline{X}$ Gr. Level	% within 6 mths.	
SAT II - All Tests	E	2.2	44	
	C	1.8	21	
Reading		$\overline{X}$ GPA	% ABC	% AB
Reading School Grades	E	2.5	95	43
	C	1.1	45	15

Reading con't		$\bar{X}$ Reading Gr. Level	% above Gr. Level	
Spache Diagnostic Reading Test				
Word Recognition Level	E	3.8	94	
	C	2.5	39	
Instructional Reading Level	E	4.0	100	
	C	2.4	39	
Potential Reading Level	E	4.2	100	
	C	3.3	78	
Arithmetic		$\bar{X}$ GPA	% ABC	% AB
Arithmetic School Grades	E	3.1	100	83
	C	1.9	79	12
		$\bar{X}$ Gr. Level	% within 6 mths. or above Gr. Level	
Arithmetic Test-SAT II	E	2.7	53	
	C	1.8	32	
		$\bar{X}$ Scaled Score	% above standardization $\bar{X}$	
Arithmetic subtest WISC	E	12.1	88	
	C	9.4	50	
Language		$\bar{X}$ Lang. Age	% of children with LA CA	
ITPA-4 subtests Aud.-Vocal Assoc. Vocal Encoding Visual-Motor Assoc. Visual Decoding	E	7-10	54	
	C	6-11	13	

Reading		$\bar{X}$ Reading Gr. Level	% above Gr. Level	
Spache Diagnostic Reading Test				
Word Recognition Level	E	3.0	48	
	C	1.8	14	
Instructional Reading Level	E	2.8	52	
	C	1.6	15	
Potential Reading Level	E	3.5	86	
	C	2.8	57	
Arithmetic		$\bar{X}$ GPA	% ABC	% AB
Arithmetic School Grades	E	2.4	90	43
	C	1.5	55	15
		$\bar{X}$ Gr. Level	% within 6 mths. or above Gr. Level	
Arithmetic Test-SAT II	E	2.2	40	
	C	1.7	16	
		$\bar{X}$ Scaled Score	% above standardization $\bar{X}$	
Arithmetic subtest WISC	E	10.3	61	
	C	8.3	20	
Language		$\bar{X}$ Lang. Age	% of children with LA CA	
ITPA-4 subtests Aud.-Vocal Assoc. Vocal Encoding Visual-Motor Assoc. Visual Decoding	E	7-5	40	
	C	6-9	14	

Language con't		$\overline{X}$	
Verbal Language			
Words per Sentence	E	11.7	
	C	7.9	
Number of Sentences	E	12.9	
		10.3	
Written Language		$\overline{X}$	% above Standardization norms
Words per Sentence	E	8.5	65
	C	5.8	6
Number of Sentences	E	5.1	12
	C	3.4	11
Syntax Quotient	E	.89	59
	C	.73	28
Auditory Discrimination	E	69.9	
	C	66.4	
Personal-Social		$\overline{X}$	
Self Concept			
Florida Key	E	62.9	
	C	50.1	
Achievement Motivation		$\overline{X}$	% above adequate
Teacher Ratings	E	2.8	96
	C	2.2	71
Perceptual Motor		$\overline{X}$	% within average range
Bender Gestalt	E	4.5	95
	C	6.3	68

Language con't		$\overline{X}$	
Verbal Language			
Words per Sentence	E	10.2	
	C	8.3	
Number of Sentences	E	11.8	
	C	8.1	
Written Language		$\overline{X}$	% above Standardization norms
Words per Sentence	E	8.0	40
	C	4.2	10
Number of Sentences	E	4.8	20
	C	1.9	10
Syntax Quotient	E	.86	30
	C	.38	19
Auditory Discrimination	E	70.6	
	C	62.5	
Personal-Social		$\overline{X}$	
Self Concept			
Florida Key	E	56.0	
	C	48.6	
Achievement Motivation		$\overline{X}$	% above adequate
Teacher Ratings	E	2.4	87
	C	2.1	59
Perceptual Motor		$\overline{X}$	% within average range
Bender Gestalt	E	5.1	91
	C	8.0	59

APPENDIX X

A Post Second Grade Comparison between the E Children who prior to Early Childhood Education were below the Average Range of Intelligence ($\bar{X}$ IQ = 80) and the C Children who prior to Early Childhood Education were within or above the Average Range of Intelligence ($\bar{X}$ IQ = 98)

Pre-Program

Stanford Binet IQ	$\bar{X}$
E (Pre-Program<89 IQ)	80
C (Pre-Program>90 IQ)	98

Post Second Grade

Intelligence			
Stanford Binet IQ		$\bar{X}$	WOAAROI
E (Pre-Program<89 IQ)		97	71%
C (Pre-Program>90 IQ)		93	56%
WISC-VIQ			
E (Pre-Program<89 IQ)		99	81%
C (Pre-Program>90 IQ)		92	50%
PMA-DIQ			
E (Pre-Program<89 IQ)		85	43%
C (Pre-Program>90 IQ)		79	17%
Achievement	$\bar{X}$ GRA	% ABC	% AB
School Grades			
E (Pre-Program<89 IQ)	2.5	95%	43%
C (Pre-Program>90 IQ)	1.9	73%	24%
Stanford Achievement Test II		$\bar{X}$ Gr. Level	% within 6 mths. or above Gr. Level
E (Pre-Program<89 IQ)		2.2	44%
C (Pre-Program>90 IQ)		1.9	34%
Reading	$\bar{X}$ GRA	% ABC	% AB
Reading School Grades			
E (Pre-Program<89 IQ)	2.5	95%	43%
C (Pre-Program>90 IQ)	1.7	61%	17%
Spache Diagnostic Reading Test		$\bar{X}$ Gr. Level	% above Gr. Level
Word Recognition			
E (Pre-Program<89 IQ)		3.0	48%
C (Pre-Program>90 IQ)		2.5	39%
Instructional Reading			
E (Pre-Program<89 IQ)		2.8	52%
C (Pre-Program>90 IQ)		2.4	39%

Reading con't

Spache Diagnostic Reading Test Potential Reading	$\bar{X}$ Gr. Level	% above Gr. Level
E (Pre-Program<89 IQ)	3.5	86%
C (Pre-Program>90 IQ)	3.3	78%

Arithmetic

Arithmetic School Grades	$\bar{X}$ GRA	% ABC	% AB
E (Pre-Program<89 IQ)	2.4	90%	43%
C (Pre-Program>90 IQ)	1.9	79%	12%

Arithmetic Achievement Test Performance	$\bar{X}$ Gr. Level	% within 6 mos. or above Gr. Level
E (Pre-Program<89 IQ)	2.2	40%
C (Pre-Program>90 IQ)	1.8	32%

Arithmetic Subtest of WISC	$\bar{X}$ Scaled Score	% above the Standardization Mean
E (Pre-Program<89 IQ)	10.3	61%
C (Pre-Program>90 IQ)	9.4	50%

Language

Four Subtest of the ITPA (Auditory Vocal Assoc., Vocal Encoding, Visual Motor Assoc., Visual Decoding)	$\bar{X}$ Lang. Age	% of Children with LA > CA
E (Pre-Program<89 IQ)	7-5	40%
C (Pre-Program>90 IQ)	6-11	13%

Verbal Language Words per Sentence	$\bar{X}$
E (Pre-Program<89 IQ)	10.2
C (Pre-Program>90 IQ)	7.9
Number of Sentences	
E (Pre-Program<89 IQ)	11.8
C (Pre-Program>90 IQ)	10.3

Written Language Words per Sentence	$\bar{X}$	% above Standardization norm
E (Pre-Program<89 IQ)	8.0	40%
C (Pre-Program>90 IQ)	5.8	6%
Number of Sentences		
E (Pre-Program<89 IQ)	4.8	20%
C (Pre-Program>90 IQ)	3.4	11%
Syntax Quotient		
E (Pre-Program<89 IQ)	.86	30%
C (Pre-Program>90 IQ)	.73	28%

Language con't	$\overline{X}$	
Auditory Discrimination		
E (Pre-Program<89 IQ)	70.6	
C (Pre-Program>90 IQ)	66.4	
Personal-Social	$\overline{X}$	
Self-Concept		
E (Pre-Program<89 IQ)	56.0	
C (Pre-Program>90 IQ)	50.1	
Achievement Motivation	$\overline{X}$	% above Adequate
E (Pre-Program<89 IQ)	2.4	87%
C (Pre-Program>90 IQ)	2.2	71%
Perceptual Motor	$\overline{X}$	% Within Average Range
Bender Gestalt		
E (Pre-Program<89 IQ)	5.1	91%
C (Pre-Program>90 IQ)	6.3	68%